Appendix H

Part 4

RESPONSIVENESS SUMMARY FOR OPERABLE UNITS 2 AND 3
NEAL'S LANDFILL

Comment 1: SENES Oakridge Inc. (SENES), who is a consultant working for the Citizens Opposed to PCB Ash (COPA) stated that based upon the available information, SENES would agree with the selection of Alternative 3 (United States Environmental Protection Agency chosen alternative). The commenter continues stating that this alternative addresses the local contamination, increases the amount of water treated, and is expected to achieve the fish remediation goals in the desired time frame. In addition, of the Alternatives that are expected to achieve the goals, it is the most cost effective. The commenter continues with stating that (1) it would have been good to divert the groundwater conduit upstream and that tanks or settling basins to store water would bring its own set of problems since it would require considerable land and contaminated water and sediment would be open to wildlife and perhaps to livestock or people; and (2) doubling the size of the spring treatment facility would treat more mass but does not justify the increased cost. The commenter would like to see this option revisited in the future if the remediation goals are not met. The commenter continues stating that it is essential that the remedial efforts predicted by the model are seen in fact and that if the monitoring does not show the anticipated improvement, reassessment of the remedy will be required.

Response 1: The U.S. EPA agrees with the commenter. The Agency is of the opinion that Alternative 3 is the best balance of the nine criteria. It is important to point out that the extensive monitoring will help to verify the predictions of the fate and transport model. If the model predictions are incorrect, a reopener clause will be used to perform additional investigations and implement a revised remedy to ensure that the fish remediation goals are met and the remedy remains protective of human health and the environment.

Comment 2: SENES stated that U.S. EPA discusses in Appendix A of the human health risk assessment that the estimated rate of increase in harvestable fish biomass with increasing downstream distance could be underestimated and would mean that the sustainable ingestion rates for downstream locations would be underestimated, and consequently, the calculated risks for those locations would be underestimated. The commenter states however, it is doubtful that any underestimate in ingestion rates or calculated risks would be large and even doubling the ingestion rates would be unlikely to change the decisions that were made on the basis of the human health risk assessment.

Response 2: U.S. EPA agrees with the commenter that changing the ingestion rates would unlikely change the results of the human health risk assessment.

Comment 3: COPA stated that they would like to see zero PCB mass escape and would prefer alternatives that would eliminate any discharge of PCBs into the environment; however, that they do agree that the selected alternative meets the guidelines of reducing risk to acceptable levels.

Response 3: U.S. EPA understands the concern of the commenter regarding the release of PCB mass downstream into Richland Creek. The results of the fate and transport model show that water flow greater than 500 gallons per minute that bypasses the water treatment plant does not have a large effect on PCB levels in fish and the fish remediation goals will be met without capturing and treating this water. The PCBs that bypass the water treatment plant during storms flow downstream into the larger Richland Creek, and do not pose unacceptable risk. Therefore, to treat this mass which bypasses the current water treatment plant is unnecessary. It should be pointed out that water sampling data show a 6% yearly decrease in PCB concentrations from South Spring since the completion of the source control in 1999. Continued monitoring of water, sediment and fish tissue after the construction of the groundwater and sediment operable units will verify if the fish remediation goals are being met and if the fate and transport model was accurate in its predictions.

Comment 4: The League of Women Voters stated that they would favor Alternative 4 which adds two million gallons of stormwater storage to U.S. EPA's chosen alternative. The commenter states that considering that increasing the size and operation of an enlarged plant would be very expensive, and that the enlarged plant would be oversized for most of its functional life, a better engineering approach would seem to be to add storm water storage capacity at Neal's Landfill. The two million gallon figure suggested under option four is reasonable considering historical storm water events gauged at the treatment facility at the north end of Neal's landfill near where the flow enters Conard's Branch. The addition of such an impoundment would also provide passive PCB removal through sedimentation and would thus prolong the life of the carbon in the treatment plant. A down side to a storm water storage facility, if open to the air would be the potential for PCB volatilization and for bioturbation and wildlife exposure to the accumulated PCB-laden sediment.

Response 4: U.S. EPA did not choose Alternative 4 because the fate and transport model shows that the addition of stormwater storage offered no significant advantages in terms of reducing PCB levels in fish tissue. The results of the fate and transport model show only a 1 to 2 % decrease in fish PCB concentrations after 10 years with storing two million gallons of stormwater. The PCB mass treated would increase by approximately 9% with the addition of stormwater storage, but this does not justify the addition with only a one to two percent reduction in PCB levels in fish. If the long-term monitoring of water, sediment and fish tissue does not produce the expected results as predicted in the fate and transport model, then the storage of stormwater may be reevaluated.

Comment 5: Protect Our Woods states that water treatment cannot work in a karst environment, that karst is unpredictable and uncontrollable, and U.S. EPA stated correctly some decades ago that complete excavation should be the site remedy. The commenter continues that U.S. EPA should reconsider its position and do additional excavation of PCBs at Neal's Landfill not only in the soil, but also in the karst bedrock, wherever PCBs can be found. According to the commenter, the expectation that water treatment and sediment removal will be effective when there are still PCB reservoirs in

place at Neal's Landfill is simply unrealistic, and the commenter asserts that the proposed remedy is not protective of public health and the environment, locally or globally.

Response 5: U.S. EPA disagrees with the commenter. First, water treatment can be successful in a karst environment and the results of the fish sampling and spring sampling since sampling begun in the 1980s have shown a reduction over time in Conard's Branch, Richland Creek and Clear Creek Second, additional excavation at the Site to remove PCBs from the landfill and the karst bedrock does not make sense for the reasons explained by U.S. EPA when it selected the remedy for the source control operable unit. Since the early 1980s when U.S. EPA thought complete excavation of PCBs was the most appropriate remedy, a large amount of information has been gathered and developed regarding water contamination at the site. Further, the evaluation of the Neal's Landfill system in the fate and transport model has convinced U.S. EPA that completing the source control, groundwater and sediment operable units will produce a remedy that is protective of human health and the environment.

Comment 6: Protect Our Woods states that PCBs are a persistent toxic compound, bioaccumulate, biomagnifiy in the aquatic and terrestrial food chains and ultimately what matters is the total mass of PCB released. The commenter disagrees with U.S. EPA's position that unless a single source can be shown to have significant impact standing alone that can be tied to local risks that it is not actionable under Superfund. The commenter states that "unwise practices" have resulted in over-exposure to PCBs by allowing multiple PCB release points and multiple PCB contamination sources. According to the commenter, the cumulative impacts of all these sites have created this over-exposure problem and the only way to deal with it is by eliminating those sources one at a time. The commenter contends that Bloomington is one of the major PCB release points in the country and that leaving PCBs in the environment to be released over time is an abandonment of U.S. EPA's obligation under Superfund and is an abandonment of our ethical obligation to future generations.

Response 6: U.S. EPA disagrees with the commenter. The Superfund program is concerned with selecting an implementing a remedy to address and abate risks to human health and the environment posed by specific sites. At Neal's Landfill, U.S. EPA has determined that it is not necessary to excavate and remove all source contamination to achieve a remedy that is protective of human health and the environment. Rather, for the reasons set forth in the administrative record for Neal's Landfill, U.S. EPA believes that the source control remedy for the first operable unit, in combination with the remedial components required by Alternative 3, will be protective of human health and the environment. The commenter also states that Bloomington is a major PCB release point in the country without providing any data to support the statement. Evaluation of air data completed previously by an Indiana University professor shows PCB air levels similar to other cities in the Midwest such as Chicago or Milwaukee.

Comment 7: Protect Our Wood states that they would like U.S. EPA to reconsider its decision to not capture and treat storm flow. The commenter states that large storms produce enough PCBs in one day as many days of low flow and Protect Our Woods

would like U.S. EPA to thoroughly assess and then address base flow or underflow springs as well as surface or overflow springs.

Response 7: The commenter is referred to the Fate and Transport Model Report, dated March 5, 2007, for a detailed discussion of why storm events are not affecting fish tissue and the subsequent human health and ecological risk. According to the model, the PCBs released during storm events at flows greater than 500 gpm do not require capture since they provide only 11% of the PCBs to fish tissue in Creek Chub within Conrad's Branch, 31% of the PCBs in fish tissue in Creek Chubs within Richland Creek at Vernal Pike, and 29% of the PCBs in Longear Sunfish within Richland Creek at Vernal Pike. The fate and transport model predicts that the fish remediation goals will be met within 10 years and that storm events greater than 500 gpm are not greatly affecting PCB levels in fish. Monitoring after completion of the construction will verify if the fate and transport model is correct in its predictions. If the predictions are inaccurate, the site remedy will be reopened by U.S. EPA. Regarding the request to thoroughly assess and address base flow or underflow springs as well as surface or overflow springs, U.S. EPA is addressing the contaminated springs. Improvements in the low-flow collection system will capture PCB-contaminated water during low-flow conditions that are not currently being treated. A number of investigations have occurred, including dye trace studies to identify springs that are connected to the Neal's Landfill site. U.S. EPA has fully assessed the springs connected to Neal's Landfill and the commenter is referred to the Administrative Record for further information.

Comment 8: Protect Our Woods states that they would like a thorough assessment of the PCB releases into the air that contribute to the total mass of PCBs released.

Response 8: U.S. EPA did evaluate air sampling data obtained during the implementation of the source control operable unit along with the report developed by QEA Corporation (Attachment 1 of the Responsiveness Summary which is an excerpt from the Fate and Transport Model Report – March 5, 2007). U.S. EPA analysis of the air data and the results of the model simulation of volatilization show that PCB air emissions are minor and do not require evaluation in either the human health or ecological risk assessment.

Comment 9: Protect Our Woods states that there should be a renewed assessment of the extent and scope of contamination at Neal's Landfill and that the characterization was inadequate. The borings placed 100 feet apart missed large amounts of capacitors.

Response 9: The commenter is referred to the Responsiveness Summary for the source control operable unit for a specific response to this comment. U.S. EPA did determine the nature and extent of contamination during the source control operable unit. The Remedial Action Objectives have been met with the source control operable unit and with the implementation of operable units 2 and 3, the Neal's Landfill site will be protective of human health and the environment.

Comment 10: Protect Our Woods states that John Foster indicated that there were known contaminated areas outside the boundaries of Neal's Landfill that had been ignored and those areas need to be addressed.

Response 10: U.S. EPA did meet with John Foster at Neal's Landfill after the completion of the source control operable unit to discuss his concerns about contamination outside the boundaries of the site. Mr. Foster who was an equipment operator during the installation of the interim cap in the 1980s could not provide any specifics regarding contaminated areas outside the fence. His recollection was in reference to areas on the north side of the sloped area of the landfill. This area was excavated during the 1999 remediation. The area outside the fence was evaluated and no evidence of disposal was discovered. Sampling data to verify the cleanup also did not demonstrate that disposal occurred outside the fence line. If the commenter has specific information on disposal areas outside the fence line, feel fee to submit the information to U.S. EPA for evaluation.

Comment 11: Protect Our Woods states that in their view, U.S. EPA is legally incorrect in excluding additional excavation, as at least an alternative to be considered by and evaluated in their proposal. In Protect Our Woods view, additional excavation is required.

Response 11: U.S. EPA is unclear as to what the commenter is referring to when stating that U.S. EPA is "legally incorrect" by not including a complete excavation remedy for operable units 2 and 3. U.S. EPA followed the National Contingency Plan (NCP) and CERCLA throughout the development of this ROD Amendment, as well as the ROD Amendment process for the source control operable unit U.S. EPA did evaluate complete excavation during the source control operable unit and determined it was not the best balance of the nine criteria. As a result, U.S. EPA did not select complete excavation as the remedy for the source control operable unit.

Comment 12: One commenter stated that U.S. EPA's goal in fish is disappointing since that goal should be zero. The commenter continues stating that Westinghouse would want a goal that is cost effective, but the U.S. EPA's goal should be the complete removal of all PCBs from the environment. The commenter argues that PCBs go down stream during storm events and are washed away so the solution to pollution is dilution, which is not appropriate. The commenter asserts that the public expects a higher standard from U.S. EPA.

Response 12: U.S. EPA evaluated the risk of PCBs in fish tissue to human health and to ecological receptors and determined that the fish remediation goals are protective of human health and the environment. In addition, the fate and transport model has predicted that these fish remediation goals would be met in 10 years. U.S. EPA has carefully reviewed the model and determined that it has been developed appropriately. Using U.S. EPA's most recent risk assessment guidance and evaluating the health effects of PCBs and the dioxin-like PCBs, having zero discharge is not necessary to protect human health and the environment.

Comment 13: Protect Our Woods states that U.S. EPA includes its usual caveat on page 1 that U.S. EPA in consultation with other government parties will select the final remedy for the site after reviewing and considering all information submitted during the public comment period and may modify the Preferred Remedial alternative or select another remedial alternative. The commenter argues that such statements have to betaken with a grain of salt for past experience has proven the Preferred Alternative is engraved in stone before the public sees the Proposed Plan.

Response 13: U.S. EPA disagrees with the commenter. U.S. EPA does take public comments into consideration and responds to those comments in the Responsiveness Summary. The U.S. EPA has issued a Technical Assistance Grant (TAG) to Citizens Opposed to PCB Ash (COPA) to help facilitate the dissemination of information and hire consultants to provide assistance in evaluating the technical information. If public comments disclosed facts or considerations which indicate that the Preferred Remedial Alternative is inappropriate, improper, or inadequate, U.S. EPA would modify the Preferred Remedial Alternative or select another remedial alternative.

Comment 14: Protect Our Woods states that the necessity for "complete removal" of electrical capacitors filled with PCBs, PCB-contaminated soils, ash, and other materials from the NPL Sites of LLL and NL, was incorporated into the "EPA-issued Consent Decree of December 1984" because they had been dumped in "karst without bottom liners," which enabled the groundwater to rise up into the landfills during storms with resultant leaching of the PCBs into the groundwater and escape into the environment from many springs connected to the landfills. According to the commenter, the scientific consultants hired by U.S. EPA in the early 1980s, Dr. Richard Powell, Philip LaMoreaux, and R.A. Griffin, (all knowledgeable about KARST in many and varied ways) stressed the need for complete removal as an end in itself and not tied to incineration. The commenter argues that if an alternative remedy to incineration was found to be desirable, complete removal of the PCBs over Karst without liners would still be appropriate and applicable.

Response 14: U.S. EPA did not issue the Consent Decree that required the excavation and incineration of PCB-contaminated at Neal's Landfill and other sites in and around Bloomington. Rather, the Consent Decree, which memorialized the remedy selected by U.S. EPA, was issued by the United States District Court for the Southern District of Indiana. In 1994, as a result of community opposition to the incineration remedy, the parties to the Consent Decree informed the Court that they planned to return to the negotiating table in an effort to reach consensus upon an alternative remedy for the Bloomington sites. They further informed the Court that their discussions would be based upon a reinvestigation of the sites to determine the risks to human health and the environment. Based upon the reinvestigation of Neal's Landfill, U.S. EPA no longer believes that complete excavation of the site is the best remedy for abating risks posed by the Site. As explained by U.S. EPA when it selected the alternative remedy for the source control operable unit, data does not show water rising up into the landfill during

storms and resulting in PCB leaching into groundwater. Rather, the data supports the conclusion that PCBs deep in the rock under and around the landfill are most likely the source of on-going releases into Conard's Branch and Richland Creek. Accordingly, U.S. EPA now believes that the best remedy to abate risks at Neal's Landfill is the "hot spot" removal already implemented by CBS in combination with remedial activities set forth under Alternative 3. As explained by the parties to the Consent Decree in filings with the Court, the parties intend to modify the Consent Decree to replace the original remedy for Neal's Landfill with this alternative remedy.

Comment 15: Protect Our Woods has been disturbed for years by U.S. EPA's failure to recognize that PCBs are highly volatile, vaporize readily, and are no respecter of boundaries, traveling amazing distances, found everywhere on earth and bio-accumulate in all life on earth and are persistent in the environment. The commenter asserts that U.S. EPA has omitted PCBs' vaporization characteristic in design and description of its final remedial actions for cleanup of Bennett's Quarry Dumps and Neal's Landfill. Further, the commenter asserts that this characteristic was omitted by U.S. EPA from various Risk Assessments because U.S. EPA only acknowledged dermal exposure and ingestion of PCBS as possible risks. Protect Our Woods believes U.S. EPA's action level of 1000 ng/m3 is a permissive U.S. EPA invention because no threshold exists below which PCBs can be considered harmless. Finally, the commenter assert that PCBs bio-accumulate, which the commenter calls "an insidious fact for a community that gets another release of PCB emissions from many springs into their atmosphere of PCBs every time it rains and storms."

Response 15: The commenter is incorrect in stating that PCBs are highly volatile compound. PCBs are classified as a semi-volatile compound due to its Henry's Law Constant. The commenter is referred to Attachment 1 which shows that between 2001 and 2005, total volatilization from Conard's Branch was calculated to be 0.09 kg, which represents 3% of the total PCB mass entering from the spring and water treatment plant effluent. In development of the human health and ecological risk assessments, U.S. EPA did evaluate the inhalation pathway and determined that it was a minor risk compared to the ingestion of fish. Regarding the 1,000 nanograms per meter cubed standard, this value was used as an action level during the excavation phase based upon the National Institute of Occupational Safety and Health (NIOSH) standard and was not a permissive U.S. EPA invention. The statement that no threshold exists below which PCBs can be considered harmless is incorrect and goes against the scientific literature. U.S. EPA agree with the commenter's assertion that PCBs bio-accumulate, but for the reasons just explained, U.S. EPA disagrees that volatization of PCBs contribute significantly to the bio-accumulation of PCBs in human and ecological receptors at Neal's Landfill

Comment 16: Protect Our Woods states that U.S. EPA does not describe Neal's Landfill in its Proposed Plan OU2 & 3 as it appeared to the public. The Monroe County Health Department (MCHD, the Indiana State Board of Health and U.S. EPA's scientists (ISBH) (Sanitary Engineering Division) from 1966-1972 when vast numbers of Westinghouse defective capacitors filled with PCBs (estimated by Westinghouse under oath around 40,000) were being dumped, scavenged and burned at the Landfill along with vast

amounts of the toxic solvent Trichloroethylene and tons of PCB-saturated filter clay, sawdust and rags, used to cleanup the Westinghouse Plant from spilled PCBs etc.

According to the commenter, Neal's Landfill was a scandalous common dump, a renegade operation where no attempt was made to abide by any "sanitary" rules. The commenter complains that U.S. EPA gives a great deal of space in its Proposed Plan for OU2 & 3 to listing response actions performed at the Landfill, but that U.S. EPA fails to state the actual total removal of waste situated over Karst without a liner. According to the commenter, U.S. EPA did acknowledge on March 16, 2002 that Operable Unit 1 had failed with high levels of PCBs still pouring out into the environment during storms. The commenter derides the response action selected by U.S. EPA with respect to the source control operable unit, calling the action a "farce" because U.S. EPA characterized as a "hot spot" any area where PCB concentrations exceeded 500 ppm. Further, the commenter asserts that the plan prepared for the scope of contamination study was clearly not representative of the site. Finally, the commenter accuses U.S. EPA of denigrating the significance of Neal's Landfill as a National Priority List Site to which U.S. EPA's scientific consultants accorded particular significance, recommending an RI/FS be prepared and complete removal performed as soon as possible to protect public health and the environment.

Response 16: Contrary to the commenter's assertions, U.S. EPA has described and characterized Neal's Landfill based upon all facts known to U.S. EPA about activities that occurred at the Site. Further, the commenter's assertion that U.S. EPA has acknowledged failure of operable unit 1 is incorrect. The purpose of operable unit 1 was to eliminate threats posed by PCBs within the former waste pile at Neal's Landfill and to prevent these PCBs from continuing to act as a source for the contamination released into Conard's Branch. The "hot spot" removal performed by CBS has been successful in achieving these goals. That said, it has always been U.S. EPA's position that additional response actions must be undertaken to address PCB contamination that had migrated out of the former waste pile before the "hot spot" removal was completed. Having now completed an investigation of this contamination that is the equivalent of a Remedial Investigation and Feasibility Study, U.S. EPA has concluded that its original remedial decision should be amended to incorporate the remedial components set forth under Alternative 3. These remedial components, in combination with the response actions required by operable unit 1, will result in a final alternative remedy that is protective of human health and the environment. Finally, the commenter's criticism of the "hot spot" removal are not pertinent to the remedial action now proposed by U.S. EPA. Commentators from Protect Our Woods raised the same criticisms when U.S. EPA originally proposed the "hot spot" removal. U.S. EPA considered and rejected these criticisms for the reasons explained by U.S. EPA in the responsiveness summary attached to the ROD Amendment for operable unit 1.

Comment 17: Protect Our Woods states that U.S. EPA appears to base its use of 500 ppm for the "hot spot" removal on a 1990 Directive titled Guidance on Remedial Actions for Superfund Sites with PCB Contamination. This guidance states that principal threats will generally include material contaminated at concentrations exceeding100 ppm for

sites in residential areas and concentrations exceeding 500 ppm for sites in industrial areas. According to the commenter, U.S. EPA should have based the "hot spot" removal upon the 100 ppm standard because Neal's Landfill is located in a rural area, not an industrial area. The commenter bases this argument upon U.S. EPA's statement in the proposed plan for operable units two and three that Neal's Landfill is located in a rural setting, surrounded primarily by agricultural and wooded land, with few residences within one mile of the site.

Response 17: This comment is not pertinent to the response action proposed by U.S. EPA with respect to groundwater, surface water and sediment contamination. Rather, it is pertinent to the response action that U.S. EPA proposed and selected with respect to the source control operable unit. That said, the commenter is incorrect in asserting that Neal's Landfill is not an industrial site. It qualifies as an industrial site because landfill operations occurred on the property, including the acceptance of municipal and industrial waste. While the area surrounding the site is agricultural and wooded, this fact is not dispositive with respect to the classification of the landfill. Many Superfund sites are classified as industrial even though the surrounding property is something other than industrial such as residential or rural.

Comment 18: Protect Our Woods notes that Dr. Richard Powell and Dr. Philip La Moreaux, who are experts on the geology and hydrology of karst, were retained by U.S. EPA in the mid-1980s to study Neal's Landfill and the surrounding area. The commenter notes the experts found evidence of a hydrogeologic connection between the landfill and Northwest Spring System, and that the experts concluded that PCBs from the site were being released into Conard's Branch and Richland Creek. According to the commenter, the experts concluded that the only viable method of protecting public health and the environment was to remove all PCB-contaminated waste from the landfill. The commenter further states that the experts recommended that action be taken as soon as possible because the bedrock around the site was highly fractured and jointed, causing PCB-contaminated leachate to migrate rapidly through the bedrock The commenter states that the experts opined that releases of PCBs from the Northwest Spring System were likely to continue for decades unless some remedial action was taken.

The commenter states that U.S. EPA prepared an RI/FS in 1983 supporting the complete removal of all PCBs from the site, but that CBS rejected this approach as too costly. According to the commenter, CBS agreed to a "sweetheart" deal that would allow the company to build its own incinerator, using City of Bloomington's municipal solid waste as fuel, for which the City would pay tipping fees. According to the commenter, U.S. EPA's experts arranged for a protective provision to be inserted in the Consent Decree that required the complete removal of all PCBs from the Site

Response 18: As explained in response to comment 14, the original remedy selected by U.S. EPA was never implemented by CBS because the parties agreed to return to the negotiating table for the purpose of exploring an alternative remedy to protect public health and the environment. As part of their discussion, the parties further agreed that the alternative remedy would be based upon new investigations of the sites. As a result of

these new investigations, U.S. EPA has learned new facts about releases of PCB-contaminated groundwater that were not known by U.S. EPA or its experts when the original remedy was selected in the mid-1980s. For instance, U.S. EPA learned that there are in-stream springs in Conard's Branch that are contributing to PCB releases during low-flow. Based upon the new investigation of the Site, U.S. EPA considered and rejected the complete excavation of Neal's Landfill as the best approach for addressing source contaminate at the Site. U.S. EPA refers the commenter to the responsiveness summary for the source control operable unit for an explanation as to why complete excavation was not chosen by U.S. EPA. U.S. EPA now believes that the "hot spot" removal, combined with the remedial components set forth under Alternative 3, offers the best approach for protecting public health and the environment.

Comment 19: Protect Our Woods states that U.S. EPA did not conduct a Remedial Investigation/Feasibility Study (RI/FS) with respect to the original remedy set forth in the Consent Decree. The commenter further states that, upon learning that U.S. EPA did not perform an RI/FS, citizens were able to secure an affidavit from Hugh Kaufman who concluded that an RI/FS is required prior to selection of a remedy at a CERCLA remedial action site. The commentator states that citizens have never been granted an RI/FS and, as a result, they have never been part of the decision-making process. Instead, the commenter complains that citizens are only permitted to "comment" on what has been negotiated between U.S. EPA and the PRP.

Response 19: The commenter apparently believes that the public typically is afforded an opportunity to participate in the preparation of an RI/FS. If so, the commenter is mistaken. An RI/FS is a document frequently generated by U.S. EPA for the purpose of presenting the results of a remedial investigation and analyzing various remedial alternatives for abating risks posed by the Site. In selecting remedial alternatives for the various Bloomington sites, U.S. EPA has not generated an RI/FS because none was required under U.S. EPA's regulations. U.S. EPA, however, has completed the functional equivalent of an RI/FS for the purpose of selecting alternative remedial actions for the various Bloomington sites. This fact was verified in 2000 by Hugh Kaufman in correspondence which was attached to the Lemon Lane Landfill ROD Amendment. The commenter is referred to the Responsiveness Summary for the source control operable unit for that site. The commenter is also incorrect in the assertion that the public has not been afforded an opportunity to participate in the remedy selection process for Neal's Landfill. U.S. EPA has met with the public in numerous public meetings, and it has published for public comment a proposed plan setting forth the various remedial alternatives considered by U.S. EPA for addressing PCB-contamination in groundwater, surface water and sediment. The Preferred Remedial Alternative set forth in the proposed plan is not binding upon either U.S. EPA or the PRP. In the event that public comments disclose facts or considerations which indicate that the Preferred Remedial Alternative is inappropriate, improper, or inadequate, U.S. EPA may modify the Preferred Remedial Alternative or select another remedial alternative. Thus, the public has been afforded the opportunity to participate in the remedy-selection process.

Comment 20: Protect Our Woods states that neither Monroe County/City of Bloomington community nor Protect Our Woods has supported the three remedies selected by U.S. EPA – namely, (1) the original remedy selected by U.S. EPA in the mid -1980s, (2) the ROD Amendment for Operable Unit 1, and (3) the Preferred Remedial Alternative for Operable Units 2 and 3. The commenter asserts that the community did not support the incineration remedy originally selected by U.S. EPA because, the scientific issues and questions surrounding many aspects of the incinerator's performance were substantial and without answers. Further, the commenter asserts that the Hot Spot cleanups failed because the scope of contamination studies were not representative of the landfills and because the identification of hot spots was poorly executed. According to the commenter, U.S. EPA's contractor, Tetra Tech, performed the scope of contamination studies but was not satisfied with the results, concluding: "Because of the variability in analytical data observed during the investigation and to conduct the RA in a cost-effective manner, Tetra Tech recommends that a comprehensive soil sampling and analysis program be implemented during the RA to determine the volume of material that contains PCB concentrations that equal or exceed 500 ppm and will need off-site disposal." The commenter asserts that the government parties in negotiation with CBS rejected Tetra Tech's recommendation to conduct further sampling of Neal's Landfill.

Response 20: U.S. EPA does not accept the commenter's assertion that the views of Protect Our Woods are representative of the entire Bloomington community. Based upon community participation in the Citizens Information Committee meetings and other public meetings, U.S. EPA is of the opinion that the majority of the Bloomington community is satisfied with the cleanups to date. Over 6,000 postcards were sent to Monroe County citizens notifying them of the Neal's Landfill Proposed Plan and no negative comments were received. Indeed, the interest of the community have been represented by the State, City of Bloomington and Monroe County – all of whom are parties to the litigation with CBS and all of whom support the Preferred Remedial Alternative and other remedial actions selected by U.S. EPA. Regarding the Tetra Tech recommendations, U.S. EPA implemented those recommendations through completing verification sampling during the remedial action.

Comment 21: One commenter from Protect Our Woods argues that U.S. EPA should require complete excavation of the Site because such a remedy was supported by U.S. EPA's consulting scientists when U.S. EPA selected the original remedy in the mid-1980s. The commenter argues that karst is always changing and evolving in response to both natural and man-made pressures. The commenter states that one may never discover where changes occur in karst because such changes are not predictable. Accordingly, the commenter argues that it is impossible to know to what extent, or how successful, the collection process of the Treatment Facility may be as new conduits develop and others change or take different directions, particularly under storm conditions.

Response 21: U.S. EPA does not agree that U.S. EPA will be unable to determine whether the collection process for the treatment system is successful. As an initial matter, CBS and U.S. EPA have conducted extensive dye-trace studies at the Site, and U.S. EPA is confident that all PCB-contaminated springs have been identified. Further,

the commenter fails to recognize the extensive monitoring program that will be done during the operation and maintenance phase. U.S. EPA will be able to determine how successful the collection process of the treatment facility may be since the fish within Conard's Branch and Richland Creek will be periodically sampled to determine if the fish remediation goals have been met or continue to be met.

Comment 22: Protect Our Woods states that the unpredictable nature of karst is evident from changes at the Site after CBS consolidated PCB-contaminated material with a concentration of less than 500 ppm. Specifically, the commenter notes that the southwest seep dried up and that several new springs appeared in Conard's Branch. The commenter also states that peak flows and flow volumes from the Northwest Spring System have decreased substantially since1983.

Response 22: The changes that have been observed post-source control operable unit have not been a result of consolidating landfill material less than 500 ppm. First, the surface water drainage was changed near the southwest portion of the site during the source control operable unit which affected how water enters the karst system. These drainage changes greatly improved the site by drying up the Southwest Seep and reducing the peak flow at the Northwest Spring System. The commenter infers that several new springs appeared in Conard's Branch due to the consolidation of landfill material. This is incorrect. U.S. EPA believes that the springs have always existed, but they were discovered only after the completion of the source control operable unit. The flow from these seeps will be captured during the implementation of operable units 2 and 3.

Comment 23: Protect Our Woods notes that the Technical Impracticability ("TI") Waiver for operable unit 2 relates only to the point source discharge at the point of water treatment prior to discharge to the creek during storm events. Referencing page 25 of the proposed plan for operable units 2 and 3, the commenter notes that peak flow rates from the Northwest Spring System during storms events are routinely higher than 11,000 gpm, and that flows greater than 500 gpm can last for many days, depending on seasonal factors and the rainfall distribution. The commenter notes that one particularly large flow event began on December 29, 2004 and continued for 21 days, bypassing approximately 61.4 million gallons of the 500 gpm water treatment plant. The commenter points out that U.S. EPA justifies the TI partially based on limited space for constructing 102 storage tanks or for building a a 47 acre lagoon – either of which would be necessary for capturing spring water during a storm event as large as the one that occurred on December 29, 2004.

The commenter argues that bypass of stormwaters over 500 gpm has been happening at this treatment plant since at least 1990 when the plant became operational. The commenter argues that citizens who knew the deficiencies about the NL Plant have called the plant a "farce" because it could only treat low flow, and because storm water over 500 ppm bypassed the plant, releasing PCBs into the environment. Further, the commenter argues that the 1 ppb limit established by IDEM with respect to the original remedy was not protective of public health and the environment. The commenter states

that the Fish & Wildlife Service ("F&WS") evaluated the plant and gave it a scathing report because of poor maintenance and function. The commenter states that the F&WS report should be pulled out of the File and read by U.S. EPA. The commenter asks that the Technical Impracticability Waiver be denied.

Response 23: The commenter has disclosed no facts or considerations which indicate that the Technical Impracticability Waiver is unwarranted. The Fate and Transport Model Report, dated March 5, 2007, explains why the capture and treatment of water in excess of 500 gallons per minute is not necessary to protect human health and the environment. Accordingly, as explained by U.S. EPA in the Technical Impracticability Waiver Report, dated July 3, 2007, U.S. EPA has determined that a Technical Impracticability Waiver is appropriate given the technical difficulties associated with capturing and treating the volume of water released during storm events. The commenter's criticism of the 1 ppb effluent set forth in the original Consent Decree is not germane to the treatment operations that U.S. EPA now proposes because the modified treatment plant will be subject to a more stringent effluent limit of 0.3 ppb. U.S. EPA is not aware of the F&WS report referenced by the commenter. U.S. EPA, however, has been working closely with F&WS field staff with respect to the proposed modification of the treatment plant, and F&WS field staff fully support the implementation of Alternative 3.

Comment 24: Protect Our Woods argues that it is irrational to single out fish for protection when, at the same time , U.S. EPA proposes a Technical Impracticability Waiver for PCB-contaminated water that bypasses the treatment plant during storm events. The commenter notes that the Fate and Transport Report provides the basis for U.S. EPA's determination that bypasses do not produce a major effect upon PCB concentrations in fish. As quoted by the commenter, the Fate and Transport Model Report states:

> Storm events producing flows greater than 500 gpm do not produce a major effect on PCB levels in fish due to the large flows not producing a long period of exposure which limits the PCB bio-accumulation in fish.
>
> PCB concentrations in fish are affected most by PCB-contaminated spring water during low flow periods. Currently, 37 % of the PCBs contributed to creek chub are from the North Spring by-pass water, which is not treated.
>
> Sediment contamination and stream bank contamination in Conard's Branch have an effect on PCB levels in creek chub, with sediments and bank soils contributing 27% of the PCBs found in the fish.

The commenter implies that the above conclusion is not reliable because it was prepared by CBS

Response 24: The commenter is incorrect that U.S. EPA has singled out fish for protection. As explained in the Ecological Risk Assessment, U.S. EPA has focused its risk assessment upon protecting Kingfisher and Mink since these animals are useful surrogates for other wildlife receptors that might feed upon PCB-contaminated fish. Further, since PCBs bio-accumulate as they move up the food chain, a remedy that is protective of Kingfisher and Mink should also be protective of fish. The commenter is also incorrect in his assertion that it is irrational to seek protection of ecological receptors while simultaneously seeking a Technical Impracticability Waiver for PCB-contaminated water that bypasses the treatment plant during storm events. As demonstrated by the Fate and Transport Model, the PCB released during storm events do not produce a major effect upon PCB concentrations in fish, and therefore, they do not produce a major effect upon other species, such as Kingfisher and Mink, that feed upon fish. U.S. EPA believes that the Fate and Transport Model is reliable because subcomponents of the model have been peer-reviewed in connection with other sites. Further, the commenter has disclosed no facts or considerations that should cause U.S. EPA to question the reliability of the Fate and Transport Model. U.S. EPA has acknowledged that the model poses certain inherent risks because – like all models – it is based upon various assumptions that cannot, at this stage, be either confirmed or refuted. To mitigate these risks, the final agreement with CBS shall include a remedy confirmation clause that will allow modifications of the remedy in the event that the goals for PCB concentrations in fish tissue are not met within 10 years after the completion of construction.

Comment 25: Protect Our Woods states that CBS obviously doesn't want to enlarge its present treatment facility or build a new one capable of collecting and treating a very large storm as can be anticipated in the future. According to the commenter, a remedy that requires complete removal of PCB-contaminated waste at the landfill is the only answer to abate risk posed by PCB-contamination in karst. The commenter argues that U.S. EPA should have considered complete excavation of the landfill as remedial alterative to address groundwater, surface water and sediment contamination. The commenter argues that U.S. EPA never informed the public of its decision to abandon complete excavation of the Site, and that the public still wants and needs complete removal of PCB-contaminated waste.

Response 25: U.S. EPA considered and rejected complete excavation of the landfill when it selected the ROD Amendment for the source control operable unit. The commenter is referred to the Responsiveness Summary for the source control operable unit, as well as to responses above, for an explanation of why complete excavation was not selected by U.S. EPA. Having considered and rejected compete removal as a remedial approach for the source control operable unit, it would have made little sense for U.S. EPA to reconsider this alternative with respect to the operable units to address PCB-contamination in groundwater, surface water and sediment. In any event, even if U.S. EPA had wanted to reconsider its decision to reject complete excavation as a remedial approach, such a remedial approach is not a feasible method of abating releases of contaminated groundwater to surface water. The groundwater investigation failed to identify all of the subterranean pathways by which PCBs are conveyed to the Northwest Spring System. Consequently, U.S. EPA has no idea where CBS would dig to remove all

of the PCBs in the karst bedrock. The commenter is incorrect that U.S. EPA never informed the public of its plan not to require the complete excavation of the landfill. This plan was not only published for public comment in advance of U.S. EPA's selection of the ROD Amendment for the source control operable unit, but the plan was also disclosed in numerous public meetings. Finally, U.S. EPA disagrees with the commenter's assertion that the "public" wants and needs complete removal of PCB-contaminated waste. U.S. EPA has provided numerous opportunities for the public to learn about, and comment upon, the Preferred Remedial Alternative to address PCB-contamination in groundwater, surface water and sediment. The relatively few negative comments that U.S. EPA has received leads U.S. EPA to believe that the public is predominantly supportive of the proposed remedy.

Comment 26: Protect Our Woods states that what we need is to have a meeting of all concerned parties and that includes the public and experts in various fields, both technical experts in Karst-those that participated in the decision-making process long ago if possible as well as financial experts who may be able to find ways to pay for Complete Removal of the remaining PCB-contaminated soils, ash and other materials; because our community cannot be held hostage any longer to principal responsible parties who do not want to do further removal but are willing to spend millions perhaps on Karst conduit and geophysical investigation with no progress in 8 years of trying. It's about time to seek Congressional Oversight Investigation of the entire Brouhaha we have had to bear up under since 1958 when Westinghouse began to dump capacitors in Lemon Lane Landfill.

Response 26: U.S. EPA has had numerous meetings with the public and top experts in fields such as karst terrain during this process. The State of Indiana, City of Bloomington and Monroe County have all been involved in determining the most appropriate remedies for the Bloomington sites, including Neal's Landfill. In addition, the U.S. EPA Ombudsman has evaluated the process and has determined that no further oversight is necessary. U.S. EPA will continue to attend CIC meetings to ensure the public stays informed and is involved.

Comment 27: National Pollution Discharge Elimination System (NPDES) program requirements of the Clean Water Act (CWA) are neither applicable, nor relevant and appropriate, requirements for the Neal's Landfill on-site water treatment plant. First, the Commenter states that it agrees with U.S. EPA that NPDES permit requirements are not applicable. Next, the Commenter states that the substantive NPDES requirements are not relevant and appropriate for the water treatment plant, because the NPDES requirements regulate the "discharge of pollutants" (defined as the addition of pollutants to navigable waters) from a "point source." In this case there is no NPDES-regulated "discharge of pollutants," because the proposed plant would not add pollutants to those already occurring as a result of existing groundwater and surface water flows. The commenter explains that, in short, "NPDES requirements are very ill-suited to the Neal's Landfill Superfund Site, which is very different from the situation in which they would normally apply. The NPDES requirements are intended to apply to the "discharge of pollutants," which is a defined term with a specific meaning under that statute. 33 U.S.C. §§ 1311, 1362(12). The term "discharge of a pollutant" is defined to mean "any addition of any

pollutant to navigable waters from any point source." 33 U.S.C. § 1362(12)." The commenter concludes that this definition does not apply to the Neal's Landfill water treatment facility because no "addition" of a pollutant is involved.

Response 27: U.S. EPA disagrees with the comment. The NPDES program requirements of the CWA are relevant and appropriate requirements for an on-site water treatment plant at Neal's Landfill's water treatment plant.

As the lead agency for the site, U.S. EPA is charged by 40 C.F.R. § 300.400(g) with identifying applicable or relevant and appropriate requirements to the release or remedial action contemplated for the site. As the commenter correctly notes, U.S. EPA determined that the NPDES program requirements of the CWA were not "applicable" to the Neal's Landfill water treatment plant that treats spring water from the Northwest Spring System. This is because Section 121(e) of CERCLA, 42 U.S.C. § 9621(e), specifically exempts on-site removal and remedial actions, such as the water treatment plant, from the permit requirement imposed by the NPDES program. Nevertheless, U.S. EPA determined that the substantive requirements of the CWA were "relevant and appropriate" to the plant (and its proposed expansion as part of the final remedial action). Specifically, U.S. EPA determined that 327 IAC 5-2-11.1, which sets forth the procedure for establishing a water-quality based effluent limits (WQBEL) for various pollutants including PCBs, was "relevant and appropriate" to establishing the effluent limit for PCBs discharged by Neal's Landfill water treatment plant.

The Commenter argues that substantive requirements of the NPDES Program are not "relevant and appropriate" because their application is not well suited to a plant that is reducing discharges of pollutants instead of adding pollutants and is more like a treatment facility that is reinjecting treated groundwater into the same groundwater system in which it was flowing before being treated. The Commenter's argument confuses the difference between requirements that are "applicable" and those that are merely "relevant and appropriate." Even if a requirement is not "applicable," U.S. EPA is nevertheless required to determine whether a regulation may be relevant and appropriate to the circumstances of the release. 40 C.F.R. ' 300.400(g)(2). A "relevant and appropriate" requirement means "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that . . . *address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.*" 40 C.F.R. § 300.5 (emphasis added). U.S. EPA believes that the substantive requirements of the NPDES program are "well-suited" to the cleanup at Neal's Landfill and the water treatment plant, because the NPDES Program, similar to the proposed CERCLA action, is concerned with abating the harmful effects of pollutants discharged into the nation's waterways.

Under 40 C.F.R. § 300.400(g)(2), U.S. EPA is required to examine eight factors, where pertinent, to determine whether a requirement addresses problems or situations sufficiently similar to the circumstances of the release or remedial action contemplated. Id. An examination of these factors (below) shows that U.S. EPA reasonably determined

that the substantive requirements of the NPDES Program, including 327 IAC 5-2-11 and 327 IAC 5-2-11.1 (the reference to 327 IAC 5-2-11.2 appears to be a typographical error repeated throughout), were "relevant and appropriate" to the proposed waste water treatment plant.

Factor 1: The purpose of the requirement and the purpose of the CERCLA action: The objective of 327 IAC 5-2-11.1 is to establish water quality based effluent limits for pollutants discharged into waters other than those within the Great Lakes system. The State of Indiana has established water quality criteria to restore and maintain the chemical, physical and biological integrity of the waters of the state. Pertinent to the present case, the State has determined that the concentrations of PCBs in Indiana waterways shall not exceed 0.79 parts per trillion ("ppt"). Based upon this water quality criteria, the State has also determined, in accordance with the guidelines set forth at 327 IAC 5-2-11.1, that dischargers of PCBs cannot discharge PCBs at a concentration greater than 0.3 parts per billion (ppb).

The problem addressed by 327 IAC 5-2-11.1 is similar to the circumstances of the remedial action proposed by U.S. EPA for the Neal's Landfill water treatment plant. Here, PCBs from the site were being released into Conard's Branch and Richland Creek, thus requiring the treatment plant, and continue to be released from the plant during certain storm events, thus necessitating this Neal's Landfill water treatment operable unit. To protect human health and the environment from these releases, U.S. EPA has proposed, among other things, to improving the low-flow collection system capabilities of the water treatment plant to capture and treat all low-flow PCB-contaminated water (which portions now bypass the plant) before it is discharged into Conard's Branch. A critical question in implementing this remedial action concerns the amount of PCB reduction that is necessary. That is, U.S. EPA must determine what concentration of PCBs can be discharged into Conard's Branch without threatening human health and the environment. The procedure set forth at 327 IAC 5-2-11.1 is directly relevant to answering this question, and it is therefore appropriate for U.S. EPA to use 327 IAC 5-2-11.1 in selecting the proposed final remedy for both the treatment plant discharge criteria and the discharge criteria for treated spring water that currently bypasses the treatment plant.

Factor 2: The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site:

The State of Indiana's NPDES Program, including 327 IAC 5-2-11 and 327 IAC 5-2-11.1, is concerned with protecting the waters of the State from the harmful effects of pollutants, such as PCBs. Similarly, the proposed remedial action is concerned with protecting Conard's Branch and Richland Creek - one of the State's waterways - from the harmful effects of PCBs. This factor, therefore, supports U.S. EPA's determination that State NPDES Program is "relevant and appropriate" to the proposed remedial action.

Factor 3: The substances regulated by the requirement and substances found at the Site:

The State of Indiana's NPDES Program, including 327 IAC 5-2-11 and 327 IAC 5-2-11.1, regulates the discharge of "pollutants," which includes PCBs. PCBs are also the contaminant of concern with respect to the proposed remedial action. Therefore, these factors also support U.S. EPA's determination that the State NPDES Program is "relevant and appropriate" to the proposed remedial action.

Factor 4: The actions or activities regulated by the requirement and the remedial action contemplated at the CECRLA site:

Like all NPDES programs, the State of Indiana's NPDES Program regulates the "discharge" of pollutants into the State's waters. Section 503(12) of the CWA, 33 U.S.C. ' 1362(12), defines the "discharge of a pollutant" in relevant part to mean "any addition of any pollutant to navigable waters from any point source." Here, the Northwest Spring System and the Neal's Landfill water treatment plant are similar to a "point source" if it is not, in fact, a point source. U.S. EPA believes, therefore, that these circumstances at the site are similar enough to the activities regulated by the State NPDES program that the substantive requirements of that program are "relevant and appropriate" to the proposed remedial action.

Section 503(14) of the CWA, 33 U.S.C. ' 1362(d), defines the term "point source" to mean "any discernible, confined and discrete conveyance . . . from which pollutants are or may be discharged." Cases brought under the CWA establish that the term "point source" is to be broadly construed. Dague v. City of Burlington, 935 F.2d 1343, 1354-55 (2d Cir. 1991); Albahary v. City and Town of Bristol, Connecticut, 963 F.Supp. 150, 152-53 (D. Conn. 1997). The term not only includes pipes or ditches, but also large land areas, such as strip mining pits and mine tailing ponds. In Washington Wilderness Coalition v. Hecla Mining Company, 870 F.Supp. 983 (E.D. Wa. 1994), the Court held that two dirt-filled mine tailing ponds and a third, active, unlined mine tailing pond from which contaminants were leaching could be point sources. Similarly, in Sierra Club v. Abston Construction, 620 F.2d 41, 45 (5th Cir. 1980), the Court held that a strip mine was a point source where "the miner at least initially collected or channeled the water and other materials" that eventually resulted in a discharge into a navigable body of water. See also Beartooth Alliance v. Crown Butte Mines, 904 F.Supp. 1168, 1174 (D. Mont. 1995)("This Court finds that Glengarry Adit, McLaren Pit, and Como Pit are 'discernable, confined and discrete' conveyances constituting point sources.").

All of these cases support the conclusion that the Neal's Landfill, Northwest Spring system, and its water treatment plant, are point sources. The Neal's Landfill occupies a former valley that was filled with garbage and commercial and industrial waste including capacitors and PCB-containing dielectric fluids. The addition of these materials and wastes changed the surface and subsurface of the land and directed the flow of water or otherwise impeded its progress. As result of these activities, PCBs are now discharged from the Northwest Spring System into Conard's Branch and Richland Creek, and hence, the site is a "point source." Other human activities that have modified or redirected groundwater and surface water flows at the site and, thus, have established "point sources" at the site include: the culvert installed under road to water treatment plant,

piping to collect PCB-contaminated water from the overflow springs for eventual treatment and the North Spring collection system. Finally, the Neal's Landfill water treatment plant itself is a point source by the fact that the State has issued a NPDES permit which the U.S. EPA has agreed to modify under CERCLA.

A second argument made by the commenter is that discharges from the water treatment plant are not "discharges" under the CWA. Specifically, the commenter argues that the purpose of plant is to *reduce* the concentration of PCBs entering into Conard's Branch and Richland Creek. Since the plant is not *adding* pollutants to Conard's Branch and Richland Creek, the commenter maintains that the effluent discharged by the plant does not qualify as a "discharge" for the purposes of the CWA.

This argument overlooks the fact that the site, not the plant, is adding pollutants to Conard's Branch and Richland Creek. If the commenter's argument were correct, then a publicly owned treatment works (POTW) would not need to obtain an NPDES permit because a POTW does not add pollutants to the waste stream that flows through the plant. Rather, a POTW merely removes pollutants from the wastestream. Numerous courts, however, held that POTWs are subject to the NPDES program. Further, comparing a water treatment plant that treats groundwater and discharges treated groundwater off-site to surface water with an on-site reinjection system is disingenuous. Off-site discharges to surface water must meet NPDES discharge criteria just as on-site treatment and reinjection of groundwater would have to meet ARARs such as drinking water standards.

Factor 5: Any variances, waivers, or exemption of the requirement and their availability for the circumstances at the CERCLA site:

Under 327 IAC 2-1-8.8, the State may grant a variance from a water quality standard used to derive a Water Quality Based Effluent Limit (WQBEL) for a specific substance. In making this determination, the State must balance the increased risk to human health and the environment if the variance is granted against the hardship or burden upon the applicant if the variance is not granted. This determination is similar to the one that U.S. EPA made in selecting the proposed remedial alternative. Specifically, U.S. EPA found that the proposed remedial action was the best choice taking into account a number of factors, including cost. For the same reasons set forth in the proposed plan as to why Alternative 3 is the best choice among remedial alternatives, U.S. EPA believes that the variance under 327 IAC 2-1-8.8 should not be granted in the present case. Likewise, U.S. EPA believes that various exemptions available under its own regulations should not be granted here.

Factor 6: The type of place regulated and the type of place affected by the release or CERLA action:

As already noted, the State NPDES Program regulates dischargers of pollutants into the States' waterways. Similarly, under the proposed remedial action, U.S. EPA seeks to clean up a site that is discharging pollutants into a State waterway. Accordingly, this

factor supports U.S. EPA's determination that State NPDES Program is "relevant and appropriate" to the proposed remedial action.

Factor 7: The type and size of structure or facility regulated and the type of size of structure or facility affected by the release or contemplated by the CERCLA action:

As already noted, the State NPDES Program regulates "point source" of pollutants discharged into the State's waterways. Neal's Landfill and the Northwest Spring System water treatment plant are all consistent with the sizes and types of point sources regulated under the Clean Water Act. The conclusion that Neal's Landfill, as well as the culvert installed under road to the water treatment plant, piping to collect PCB-contaminated water from the overflow springs for eventual treatment and the North Spring collection system are themselves each point source, is directly supported by Dague v. City of Burlington, 935 F.2d 1343 (2d Cir. 1990)(holding city landfill was a point source) . Likewise, the proposed water treatment plant is consistent with the size and type of facilities that are routinely subject to the requirements of the NPDES Program. Accordingly, this factor supports U.S. EPA's determination that State NPDES Program is "relevant and appropriate" to the proposed remedial action.

Factor 8: Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resource at the CERCLA site.

The requirements of 327 IAC 5-2-11.1 apply to all waterways in the State that are not part of the Great Lakes System, regardless of the use or potential use of the waterway. Accordingly, this factor supports U.S. EPA's determination that State NPDES Program is "relevant and appropriate" to the proposed remedial action.

Comment 28: U.S. EPA and the State of Indiana have identified 327 IAC 2-1-6, Table 1 as an ARAR. The table contains water quality limits for a wide variety of pollutants identified by the State from any source regulated by the State under the NPDES program. No effort is made to identify any specific pollutant that may be discharged from the treatment facility.

This approach is totally inconsistent with the CERCLA process of identifying specific ARARs that apply to specific CERCLA cleanups. Under CERCLA, an ARAR is supposed to be a specific "standard, requirement, criteria or limitation" that is relevant and appropriate to the specific hazardous substance, pollutant or contaminant at issue. 42 U.S.C. § 9621(d)(2)(A). Rather than identify limitations that would be applicable to the effluent from a treatment facility, U.S. EPA and the State simply identify the standards applicable to all possible pollutants that might be regulated under the program. Indeed, this approach is inconsistent with the way U.S. EPA and the State administer the NPDES program. When issuing an NPDES permit, the Indiana Department of Environmental Management (IDEM) does not simply list all the standards on Table 1; rather, it identifies the pollutants in the discharger's wastewater and only includes the limits for the pollutants identified.

The NCP defines "*relevant and appropriate requirements*" to mean substantive requirements of federal or state law, which "while not 'applicable' to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site." 40 C.F.R § 300.5. The process of identifying ARARs then involves identifying specific standards which have specific relationship to the hazardous substances found at the site. Instead of doing that, the U.S. EPA and the State simply refer to a generic table listing all substances regulated (327 IAC 2-1-6, Table 1). A general reference to the table is not sufficient. U.S. EPA and the State must identify the specific substances of concern that are present at this site and require limitations. Both CERCLA and the NCP provide that the only State standards which may qualify as ARARs are those which have been identified "in a timely manner." 42 U.S.C. § 9621(d)(2)(A)(ii); 40 C.F.R. § 300.5. The NCP further provides that a remedy must only meet those ARARs which are identified at the time a Record of Decision is signed. 40 C.F.R. § 300.430(f)(1)(ii)(B).

At Neal's Landfill, the only hazardous substance, pollutant or contaminant of concern that has been identified are PCBs. Accordingly, effluent limitations with respect to other substances may not be ARARs because there is no information to show that they may be relevant or appropriate for this Site. Therefore, the general reference to 327 IAC 2-1-6, Table 1 as an ARAR is not appropriate.

Response 28: U.S. EPA disagrees with the comment that the cited Section is not an ARAR. The Commenter's observation that section is neither applicable, nor relevant and appropriate, because the table contains water quality limits for a wide variety of pollutants and because the specific pollutant that may be discharged from the treatment facility is not identified, is associated with the Site is rejected. The requirement cited is still relevant and appropriate, because, as will be discussed more fully below, it provides "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that . . . *address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.*" 40 C.F.R. § 300.5.

327 IAC 2-1-6, and Table I, identifies the minimum surface water quality standard and establishes surface water quality criteria for specific substances, including PCBs. This provision is relevant and appropriate in determining cleanup and discharge criteria, and is directly tied to determining the discharge criteria for PCBs under 327 IAC 5-2-11.1. To date, spring water contaminants, other than PCBs, have not been identified as being at levels of concern at the Site.

Comment 29: Regarding PCBs, U.S. EPA and the State have not identified a legally enforceable effluent limitation that qualifies as an ARAR. Instead, U.S. EPA and the State rely on 327 IAC 5-2-11 and 327 IAC 5-2-11.2 [sic] as the vehicle to set an effluent limit of 0.3 parts per billion (ppb), because that is the limit of quantitation (a level which can be reliably confirmed using existing measurement technology) using existing

technology. The 0.3 ppb effluent limitation for PCBs does not qualify as an ARAR, because it has not been "promulgated" by the State as a regulatory standard.

CBS states that under the terms of the 1985 Consent Decree and an Indiana Court Decision, U.S. EPA may not impose a more stringent PCB discharge limit than 1.0 ppb without CBS's consent.

Response 29: Indiana properly identified 327 IAC 5-2-11 and 327 IAC 5-2-11.1 as ARARs and used 327 IAC 5-2-11.1 as the promulgated standard, requirement, criteria, or limitation to set an effluent limit of 0.3 ppb for PCBs. With respect to State ARARs, 42 U.S.C. § 9621(d)(2)(A)(ii) provides that

> "any promulgated standard, requirements, criteria, or limitation under a State environmental . . . law that is more stringent than any Federal standard, requirement, criteria, or limitation . . . is legally applicable to the hazardous substance or pollutant or contaminant concerned or is relevant and appropriate under the circumstances of the release of such hazardous substance or pollutant or contaminant, the remedial action selected . . . shall require, at the completion of the remedial action a level or standard of control for such hazardous substance or pollutant or contaminant which at least attains such legally applicable or relevant and appropriate standard, requirement, criteria, or limitation."

This provision does not require that a State's "promulgated standard, requirements, criteria, or limitation under a State environmental . . . law" take the form of a specific, promulgated numeric effluent limit. Rather, it simply requires that the "standard, requirements, criteria, or limitation" identified as an ARAR be promulgated. Here, 327 IAC 5-2-11.1 is the relevant and appropriate standard, requirement, criteria, or limitation promulgated by Indiana. 327 IAC 5-2-11.1(f) in pertinent part provides:

> (f) When the WQBEL for any substance is less than the limit of quantitation normally achievable and determined by the commissioner to be appropriate for that substance in the effluent, the permit shall contain the following provisions:
> (1) The permittee shall be required to use an approved analytical methodology for the substance in the effluent to produce the LOD and LOQ achievable in the effluent. The analytical method, and the LOD and LOQ associated with this method, shall be specified in the permit in addition to the following requirements:
> (A) The permit shall include conditions that state that effluent concentrations less than the limit of quantitation are in compliance with the effluent limitations.
> (B) In addition, the permit shall require the permittee to implement one (1) or more of the following requirements:
> (i) Develop a more sensitive analytical procedure.

(ii) Use an existing, more sensitive, analytical procedure that has not been approved by U.S. EPA.
(iii) Conduct studies to determine the bioaccumulative or bioconcentrative properties of the substance in aquatic species through caged-biota studies or fish tissue analyses of resident species.
(iv) Conduct effluent bioconcentration evaluations.
(v) Conduct whole effluent toxicity testing.
(vi) Other requirements, as appropriate, such as engineering assessments or sediment analyses.

For substances defined as BCCs, at a minimum, either item (iii) or (iv) shall be included in the permit.

(2) If the measured effluent concentrations for a substance are above the WQBELs and above the LOD specified by the permit in any three (3) consecutive analyses or any five (5) out of nine (9) analyses, or if any of the additional analyses required under subdivision (1)(B) indicate that the substance is present in the effluent at concentrations exceeding the WQBELs, the permit shall contain provisions that require the discharger to:

(A) determine the source of this substance through evaluation of sampling techniques, analytical/laboratory procedures, and industrial processes and waste streams; and
(B) increase the frequency of sampling and testing for the substance.

(3) The permit shall contain provisions allowing the permit to be reopened, in accordance with section 16 of this rule, to include additional requirements or limitations if the information gathered under subdivisions (1) and (2) indicates that such additional requirements or limitations are necessary.

Here, the WQBEL for PCBs is 0.001 parts per billion, which is below the limit of quantitation and limit of detection normally achievable and determined by the commissioner to be appropriate for PCBs. As a result, in accordance with the promulgated requirements of the NPDES program, the State set the effluent limit for PCBs at 0.3 ppb, which is the level at which concentrations of PCBs can be reliably quantified.

In identifying 327 IAC 5-2-11.1 as an ARAR, Indiana properly and timely identified a "promulgated standard, requirements, criteria, or limitation under a State environmental . . . law" and through application of that standard, requirements, criteria, or limitation derived the 0.3 ppb PCB effluent limitation.

U.S. EPA also notes that in footnote 6 to its Comment letter, CBS identifies a 3 ppb effluent limit taken from U.S. EPA Toxic Substances Control Act Spill Policy regulations (40 C.F.R. § 761.79(b)(1)(ii) as a higher (less stringent) limit than the "unpromulgated" limit of 0.3 ppb identified by the State. U.S. EPA concludes that the State limit of 0.3 ppb derived from application of Indiana's promulgated standard, requirements, criteria,

or limitation at 327 IAC 5-2-11.1 is more stringent than the Federal requirement and, therefore, will be used.

For purposes of identification of ARARs, U.S. EPA concludes that using a 0.3 ppb NPDES discharge limit arrived at consistent with 327 IAC 5-2-11.1(h) is appropriate. While U.S. EPA agrees that the existing Consent Decree establishes a PCB discharge limit of 1.0 ppb, U.S. EPA notes that CBS and the governmental parties are in discussions to amend the existing Consent Decree. This would include elimination of the NPDES permit and the existing discharge criteria in the Consent Decree.

Comment 30: One of the NPDES provisions identified as a potential ARAR is 327 IAC 5-2-13(f). This provision calls for composite sampling. This is not a standard or limitation. In operating the interim treatment plant required under Paragraph 59(a) of the Consent Decree, CBS has historically taken grab samples. CBS contends that sampling requirements should not be designated as ARARs because they are not standards, criteria, or limitations. But if U.S. EPA chooses to select a water treatment remedy, it should consider whether U.S. EPA should mandate composite sampling where grab sampling has been relied upon historically.

Response 30: U.S. EPA disagrees with the comment that the cited Section is not an ARARs. The Commenter's observation section is neither applicable, nor relevant and appropriate, because it does not identify a standard or limitation is rejected. The requirements cited is still relevant and appropriate, because, as will be discussed more fully below, it provides "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that . . . *address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.*" 40 C.F.R. § 300.5.

327 IAC 5-2-13(d) establishes a substantive monitoring requirement and is relevant and appropriate to the plant's operations and ability to achieve the cleanup standards, as well as ensuring U.S. EPA's and IDEM's ability to conduct oversight.

Comment 31: To the extent that NPDES provisions are identified as ARARs, CBS agrees with U.S. EPA that a technical impracticability waiver is appropriate with respect to the application of these requirements to water that is not treated in the water treatment plant.

One provision in particular which should not be applied as an ARAR is 327 IAC 5-2-8(11), which concerns by-passes. Most of the remedial alternatives under consideration involve using the existing plant to capture and treat flows of similar volume. Although, in some of these alternatives, modifications would be made in the collection system, not all the flows from springs around Neal's Landfill would be diverted to the plant. Moreover, in periods of high flow from the collected sources, the plant would not be able to capture flows in excess of 1 cubic feet per second (or 450 gallons per minute) on a consistent basis. Although the existing system is often capable of handling 500 or even

550 gallons per minute in certain situations, it cannot handle volumes greater than 450 gallons per minute in all situations. Therefore, if this provision is designated as an ARAR, there must be a technical impracticability waiver with respect to flows that are not collected by the system and with respect to flows collected by the system but which are greater than 1.0 cubic feet per second or 450 gallons per minute.

Response 31: 327 IAC 5-2-8(11) establish the substantive requirements for handling circumstances where "bypass" occurs at the water treatment plant, and is relevant and appropriate to ensuring the plant's operation and ability to achieve the cleanup standards. This provision is relevant and appropriate to how the plant is operated, and does not apply to water that is never intended to be captured and treated. Because this provision addresses plant operation, and imposes requirements that apply when the plant's operation is interrupted and thus results in bypass, it should not be waived.

Comment 32: Section 327 IAC 5-2-11.1(h) should not be considered an ARAR because it does not provide for any standard, requirement or limitation, but rather describes a process through which IDEM may impose more stringent standards than those currently in effect. Section 121(d) of CERCLA, 42 U.S.C. § 9621(d), requires U.S. EPA to determine ARARs based on the legal requirements that *are in effect at the time the remedy is selected*, not on the basis of requirements which may come into effect in the future. 42 U.S.C. § 9621(d)(2)(A)(ii), (4); 40 C.F.R. § 300.430(f)(1)(ii)(B). Application of this provision would reserve a right for IDEM to impose more stringent standards later. Listing this provision as an ARAR is inconsistent with CERCLA's requirement that ARARs must be identified at the time of remedy selection.

Response 32: See response to 29.

Comment 33: Many of the NPDES provisions identified as ARARs do not set forth limits or requirements that IDEM imposes on dischargers, but rather describe the procedures that IDEM is supposed to follow in establishing such limits. These include: 327 IAC 5-2-11(d), (e), (f), (g) and (h) and 327 IAC 5-2-11.1(a), (b), (d), (f), (g), and (h) as ARARs. These provisions should not be designated as ARARs. The term ARAR in 42 U.S.C. § 9621(d)(2)(A) refers to the specific "standard, requirement, criteri[on], or limitation" itself, not the means by which it was determined.

Section 327 IAC 5-2-11.1(d) is particularly incongruous because it relates to the establishment of WQBELs for discharges of metals, and is neither applicable or relevant and appropriate since metals are not contaminants of concern at this site.

Response 33: U.S. EPA disagrees with the comment that the other cited Sections are not ARARs. The Commenter's observation that many of the sections cited are neither applicable, nor relevant and appropriate, because they provide a means for establishing standard, requirement, criteri[on], or limitation, and not an actual standard, requirement, criteri[on], or limitation, is rejected. The requirements cited are still relevant and appropriate, because, as will be discussed more fully below, they provide "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations

promulgated under federal environmental or state environmental or facility siting laws that . . . *address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.*" 40 C.F.R. § 300.5.

327 IAC 5-2-11(d),(e),(f) (g), and (h) establish cleanup standards, standards of control, and other substantive requirements, criteria, or limitations under state environmental laws that address the situation at the site by providing a way for calculating, establishing, and specifying effluent limits and their use is well suited to this Site. These requirements are relevant and appropriate to ensuring the plant's operation and ability to achieve the cleanup standards.

As discussed in the response to Comment 29, 327 IAC 5-2-11.1 is an ARAR and was used to calculate the WQBEL effluent limit for PCBs. The commenter is citing to the subsections of that part of the Indiana Code. To the extent that the subsections must be referred to understand the context of, and calculate and arrive at, the WQBEL limit for PCBs, citation to 327 IAC 5-2-11.1 without reference to each subsection is appropriate. To date, spring water contaminants, other than PCBs, have not been identified as being at levels of concern at the Site.

Comment 34: The proposed Plan also cited various other administrative provisions of the IDEM NPDES program as ARARS. CBs does not believe that these provisions should be considered ARARs for the following reasons:

IAC Code Provision	**Requirement**	**Reason(s) why not an ARAR**
327 IAC 5-2-8(3)	Permittee shall take all reasonable steps to minimize or correct noncompliance with the permit	(1) There is no permit; and (2) this is no "standard, requirement, criteria, or limitation" under 42 U.S.C. § 9621(d)(2).
327 IAC 5-2-8(7)	Permittee shall provide a right of access to IDEM and its contractors	(1) There is no permit; (2) This is not a "standard, requirement, criteria, or limitation" under 42 U.S.C. § 9621(d)(2)(A); and (3) CBS does not own or lease the property in question.
327 IAC 5-2-8(8)	Permittee shall maintain the facility in good order	(1) There is no permit; and (2) this is not a "standard, requirement, criteria, or limitation" under 42 U.S.C. § 9621(d)(2)(A).
327 IAC 5-2-8(9)	Permittee's tampering with monitoring device is subject to criminal sanction	(1) There is no permit; (2) This is not a "standard, requirement, criteria, or limitation" under 42 U.S.C.

		§ 9621(d)(2); and (3) enforcement provisions are not ARARs.
327 IAC 5-2-8(10)	Establishes reporting requirements	Reporting requirements for CERCLA remedies are set forth in consent decrees or other enforcement documents
327 IAC 5-2-8(12)	Requirements for upset	EPA has already indicated that it intends to invoke CERCLA's technical impracticability waiver to supersede these requirements.
327 IAC 5-2-8(14)	Provisions relating to signing of reports and criminal sanctions for false reports	(1) There is no permit; (2) This is not a "standard, requirement, criteria, or limitation" under 42 U.S.C. § 9621(d)(2)(A); (3) procedural and enforcement provisions are not ARARs; and (4) these issues are generally addressed separately in a consent decree or other enforcement document.
327 IAC 5-2-11(a)(1)-(4)	Definitions of "Average Monthly Discharge," "Average Weekly Discharge," "Continuous Discharge," and "Daily Discharge," used in calculating effluent limitations.	Definitions are not in and of themselves "standard[s] requirement[s], criteria, or limitation[s]" under 42 U.S.C. § 9621(d)(2), and therefore not ARARs.
327 IAC 5-2-11(a)(5)(C)	Method of calculation for daily discharges	This methodology is not in and of itself a "standard, requirement, criteri[on], or limitation" under 42 U.S.C. § 9621(d)(2), and therefore not an ARAR.
327 IAC 5-2-11 (g))	Provisions relating to non-continuous dischargers	The Neal's Landfill plant operates on a continuous basis
327 IAC 5-9-2(a), (c), (d), (e)	Refers to best management practice programs for "ancillary manufacturing	There are no "ancillary manufacturing operations" in this situation. This

	operations"	provision is not an ARAR, because it is not applicable or relevant and appropriate under CERCLA. It is ill-suited for this situation.
327 IAC 5-9-2(i)	Discharger will amend the best management practices when there is a change to the system that affects the discharge	(1) This is not a substantive requirement of a permit, but a procedural provision relating to IDEM's administration of the program; and (2) under CERCLA, 42 U.S.C. § 9621(d)(2)(A), (4), and the NCP, 40 C.F.R. § 300.430(f)(1)(ii)(B), ARARs must be identified and are fixed at the time of remedy selection.
327 IAC 5-9-2(j)	Provision relating to the amendment of best management practices plan if it proves ineffective	(1) This is not a substantive requirement of a permit, but a procedural provision relating to IDEM's administration of the program; and (2) under CERCLA, 42 U.S.C. § 9621(d)(2)(A), (4), and the NCP, 40 C.F.R. § 300.430(f)(1)(ii)(B), ARARs must be identified and are fixed at the time of remedy selection.
327 IAC 5-2-13(a), (c), (d), (e), (f)	Monitoring provisions	These provisions are not ARARs in and of themselves.

Response 34: U.S. EPA disagrees with the comment that the cited Sections are not ARARs. Although no NPDES permit is required for the Site, the requirements cited are still relevant and appropriate, because, as will be discussed more fully below, they provide "those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that . . . *address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.*" 40 C.F.R. § 300.5.

327 IAC 5-2-8(7), (8), (9), (10), (12), and (14) all establish standards of control and other substantive requirements and criteria relevant and appropriate to determining the

operation of the Neal's Landfill water treatment plant, as well as the system for treatment of storm water that currently bypasses the water treatment plant. 327 IAC 5-2-8(7) establishes the substantive requirement of IDEM access to the plant, and is relevant and appropriate to ensuring U.S. EPA's and IDEM's ability to provide oversight of plant operations. 327 IAC 5-2-8(8) establishes the substantive requirement that the water treatment plant and its equipment be kept in good working order and operated efficiently and is relevant and appropriate to ensuring the plant's operation and ability to achieve the cleanup standards. 327 IAC 5-2-8(9) and (10) establishes the substantive requirement that the operation of the water treatment plant and its equipment be monitored and identifies reporting requirements and sanctions for false reporting and is relevant and appropriate to the plant's operations and ability to achieve the cleanup standards, as well as ensuring U.S. EPA's and IDEM's ability to conduct oversight. 327 IAC 5-2-8(12) establish the substantive requirements for handling circumstances where "bypass" or "upset" occur at the water treatment plant, and are relevant and appropriate to ensuring the plant's operation and ability to achieve the cleanup standards. 327 IAC 5-2-8(14) establishes substantive reporting requirements and sanctions for false reporting and is relevant and appropriate to the plant's operations and ability to achieve the cleanup standards, as well as ensuring U.S. EPA's and IDEM's ability to conduct oversight.

327 IAC 5-2-11(a)(1)-(4) and (5)(c); 327 IAC 5-2-11(g) establish cleanup standards, standards of control, and other substantive requirements, criteria, or limitations under state environmental laws that address the situation at the site by providing a way for calculating, establishing, and specifying effluent limits and their use is well suited to this Site. These requirements are relevant and appropriate to ensuring the plant's operation and ability to achieve the cleanup standards.

327 IAC 5-9-2 (i), and (j) establish cleanup standards, standards of control, and other substantive requirements, criteria, or limitations under state environmental laws that address the situation at the site by providing a way for determining, establishing, and specifying best management practices applicable to the Neal's Landfill water treatment plant and the plan for treating water that currently bypasses the plant as described in Alternative 3 effluent limits and is well suited to this Site. These requirements are relevant and appropriate to ensuring the plant's operation and ability to achieve the cleanup standards.

327 IAC 5-2-13(a), (c), (d), (e), and (f) establish substantive monitoring requirements and are relevant and appropriate to the plant's operations and ability to achieve the cleanup standards, as well as ensuring U.S. EPA's and IDEM's ability to conduct oversight.

Comment 35: CBS has stated that air emission provisions identified by IDEM are not ARARs. In the Fact Sheet, U.S. EPA notes that the State has identified as ARARs three requirements relating to major sources of hazardous air pollutants (HAPs). These requirements are plainly inapplicable and not relevant and appropriate. One requirement, 326 IAC 2-4.1, applies to major sources of HAPs. But, based on the description of the remedial alternatives in the Fact Sheet, there is no proposal to construct a major source of a HAP. The second requirement, 326 IAC 2-5.1-3(a)(1)(D), applies to

sources of HAPs which have the potential to emit ten (10) tons or more of a HAP in a year, and the third requirement, 326 IAC 2-5.1-2(a)(1)(A), applies to sources of HAPs which also have the potential to emit five tons or more of particulate matter. Again, no such source is contemplated. Accordingly, these requirements should not have been designated as ARARs. These requirements are not only wrongly identified as ARARs, but by identifying them, U.S. EPA has created the false impression that air emissions from the proposed remedies are more extensive than contemplated.

Response 35: The identified ARARS above could, under some circumstances, be relevant and appropriate for Alternative 3. Under 326 IAC 2-4.1, any owner or operator who constructs a major source of hazardous air pollutants (HAP) shall comply with the requirements of this section. PCBs are a HAP. Thus, this section is relevant and appropriate to the extent that the selected remedy would involve the construction of a major source of HAP. Under 40 C.F.R. ' 63.41, the term "construct a major source" means to fabricate, install or erect a new process or production unit which emits or has the potential to emit 10 tons per year of any HAP. U.S. EPA does not anticipate that any of the proposed remedies would meet this threshold limit.

Under 326 IAC 2-5.1-3(a)(1)(D), a source of HAP that has the potential to emit ten tons per year of HAP must apply for a construction and operating permit. A Source with lower emissions is exempt. To the extent that any of the proposed remedies would have the potential to emit ten tons per year of HAP, the remedy must comply with the substantive requirements of a permit, although no permit would be issued for the site.

Finally, under 326 IAC 2-5.1-2(a)(1)(A), a source of HAP that has the potential to produce five tons per year of either particulate matter or particulate matter less than 10 microns in size, must apply for a registration. A source with lower emissions is exempt. To the extent that any of the proposed remedies have the potential to meet or exceed this threshold limit, the remedy must comply with the substantive requirements of the registration rule, although registration will not be required for the site. U.S. EPA does not anticipate that any of the proposed remedies will meet this threshold.

Comment 36: CBS states that they believe that the risk estimates that are provided in the revised Human Health Risk Assessment (HHRA) still contain many unnecessary precautionary default assumptions that contribute greatly to the uncertainty of the risk and hazard estimates. It appears that, in an effort to ensure that risks at the Site are not underestimated, a number of highly conservative default assumptions, which are not supported by available data or site characteristics, have been made and have resulted in substantially overestimated Site risks.

The key issues that have contributed to this overestimation and uncertainty include the following:

- Risks due to fish consumption are still overestimated due to the fact that the revised fish ingestion rates do not reflect realistic use of the resource. In addition, the exposure point concentrations (EPCs) used for some locations are based on an

extremely limited number of samples. Further, the toxicity equivalent quotient (TEQ) concentrations that have been used do not reflect the current toxic equivalency factors (TEF) that have been developed by the World Health Organization (van den Berg et al., 2006). Finally, U.S. EPA has used a methodology that was proposed in the Agencies' Dioxin Reassessment (EPA, 2000) to evaluate potential carcinogenic risks and noncarcinogenic hazards associated with the fish consumption pathway, despite the fact that this was a proposed draft approach that was strongly challenged during the peer review conducted by the National Academy of Sciences (NAS) and is currently being reconsidered by U.S. EPA.

- Risks due to other media at the Site, including surface water, sediment and soils, are also overestimated. This is due to the use of EPCs, in many locations, that are based on the maximum detected values and to the use of highly conservative exposure assumptions including high ingestion and dermal contact rates, and unrealistically high exposure frequencies.

- The total combined risk and hazard estimates, which include multiple pathways of exposure, are inappropriate due to the fact that risks and hazards have been "mixed and matched" from various portions of the Site to derive reach-specific total risk estimates. As a result, in some of the areas evaluated, the estimated risks are not representative of the potential exposure that could be attributed to those specific areas.

CBS has recommended alternative values based on their scientific merit and on additional consideration of site-specific characteristics and has combined these into alternative risk estimates. These revised risk estimates indicate that risks at this Site are likely to be lower than have been estimated in the HHRA.

Response 36: U.S. EPA's responses to each of the comments above regarding particular elements of the HHRA are addressed in the responses to specific comments below. However, U.S. EPA's responses to several points raised by CBS are summarized below.

- The assumption that fish biomass (and, therefore, potential fish tissue ingestion) will increase by 10 percent per river mile is based on the observed increase in size (for example, in width and flow rate) of Richland Creek as the distance downstream from Neal's Landfill increases. It is a well established point that, all things being equal, a larger stream will support a larger fish population than a smaller stream. U.S. EPA believes that in the absence of fish population estimates at downstream locations, the approach used produces reasonably conservative estimates of fish productivity that recognize the likely increase in fish biomass in Richland Creek downstream of Neal's Landfill. Uncertainties associated with the downstream fish tissue ingestion rates calculated based on the 10 percent assumption will be discussed in the next revision of the HHRA.

- U.S. EPA acknowledges the fact that white suckers are "generally less desirable for consumption than sunfish and that white sucker are generally expected to make up a small portion of a typical angler's diet." Consistent with revisions made previously to the Lemon Lane Landfill HHRA, U.S. EPA will revise the benthic fish tissue ingestion rate to reflect relative presence of benthic fish in the total biomass of Richland Creek. As noted in CBS's comment, white suckers make up "less than 20 percent" of the total biomass at the 1-Mile Site. Therefore, fish tissue ingestion rates at all reaches considered in the HHRA will be modified to reflect a relative presence of 80 and 20 percent pelagic and benthic fish, respectively, in the total biomass. So, for example, at the 1-Mile Site a pelagic fish tissue ingestion rate of 6 g/day was calculated (see Attachment 2 and Table 3 of the HHRA). If 6 g/day represents 80 percent of the total ingestion rate, then a benthic fish tissue ingestion rate of 1.5 g/day represents the remaining 20 percent. This represents a reduction of more than 60 percent in the benthic fish tissue ingestion rate.

- U.S. EPA acknowledges that the North and South Springs and Conard's Branch are unlikely to be visited often based on their physical characteristics and accessibility. Therefore, exposure frequencies for surface water, sediment, and soil exposures at these locations will be reduced to 20 days/year. Similarly, U.S. EPA acknowledges that Section E (beginning at the 3-Mile Site and extending more than 1.5 miles downstream) and Section F (beginning at the downstream end of Section E, extending about 1.5 miles downstream and including the 5.5-Mile Site) are more remote and are heavily overgrown with brush and woody debris as compared to Section C which includes the 1-mile Site; access to Sections E and F is expected to be less than at Section C. Therefore, exposure frequencies for Sections E (including the 3-Mile Site) and F will be reduced to 30 days/year.

- U.S. EPA acknowledges that the approach used in the HHRA to calculate total (or aggregate) risks and hazards included some double- and triple-counting of potential soil and sediment exposures. Therefore, sediment and soil risks and hazards will be revised to eliminate double- and triple counting of sediment and soil exposures. Specifically, sediment and soil risks and hazards will be reduced to reflect the assumption of equal amounts of sediment and soil exposures at each location. Also, because the available fish tissue biomass in Richland Creek may only support a small number (as low as one) of anglers, the majority of individuals that are exposed in and along the North and South Springs, Conard's Branch, and Richland Creek, are not likely to also ingest fish from Richland Creek at the assumed ingestion rates. Therefore, the revised HHRA calculations include two types of total risks and hazards: (1) totals for all relevant exposure pathways including sediment, soil, surface water, and fish tissue ingestion and (2) totals based only on all relevant sediment, soil, and surface water exposures.

Recalculated pathway-specific and total risks and hazards are summarized in Tables 1 and 2, respectively. Also, recalculated pathway-specific exposures, risks, and hazards are

documented in Tables A1 through A5 in Attachment 2. Reach-specific total risks are greater than or equal to 1E-06 (1 in 1,000,000) but less than 1E-04 (1 in 10,000) at all locations considered in Conard's Branch and Richland Creek (Conard's Branch – South Spring [2E-05]; North Spring [2E-05]; Section Pre-A [2E-05]; Section A [2E-05] and Richland Creek – Section B [2E-05];.Section C [2E-05]; Section D [9E-06]; Section E [9E-06]; Section F [3E-06]; and Section G [5E-06]) based on inclusion of fish tissue ingestion. On the other hand, location-specific total risks are greater than or equal to 1E-06 at the following Conard's Branch and Richland Creek locations when fish tissue ingestion is excluded (Conard's Branch – South Spring [4E-06]; North Spring [2E-06]; Section Pre-A [3E-06]; and Richland Creek – Section B [2E-06]; Section C [2E-06]; Section D [2E-06]; and Section E [2E-06]). Recalculated hazards equal or exceed 1 at South Spring (hazard = 1) and Section Pre-A (hazard = 1) based on inclusion of fish tissue ingestion and are less than 1 at all locations when fish tissue ingestion is excluded.

U.S. EPA has the mandate and authority to address any risks greater than 1E-06 and hazards greater than 1 including total risks and hazards inclusive of risks and hazards associated with fish ingestion that are expected to impact only a very small number of persons.

Further, PCBs are present in whole pelagic and benthic fish at concentrations greater than the Ambient Water Quality Criteria – derived fish tissue level of 0.025 part per million (ppm) and in pelagic and benthic fish fillets at concentrations greater than the PCB action level of 0.05 ppm used to trigger Indiana's fish consumption advisories. U.S. EPA's decision to require remedial action is consistent with the National Oil and Hazardous Substances Pollutant Contingency Plan (NCP) (U.S. EPA 1990) and U.S. EPA Policy.

Comment 37: CBS states that U.S. EPA has substantially reduced its fish consumption rates for the 1-Mile Site of Richland Creek from the rates used in the previous HHRA because the fish consumption rates used previously could not be supported by the productivity of that location. CBS commends U.S. EPA for considering the productivity and sustainable harvest from the 1-Mile Site in revising its fish consumption rate. However, there are still two major issues with the revised consumption rates estimated by U.S. EPA for this site.

First, the calculations of sustainable yield still assume that anglers would eat a four inch and above fish. Studies have shown that anglers prefer to keep and eat fish six inches and above. Beyond assuming that a four inch fish is desired by anglers, assuming a blanket minimum size disregards the different shapes and edible yield of fish by species. For example, sunfish and rock bass have body shapes that are considerably stouter than white suckers. Thus while studies show that anglers prefer pan fish (including sunfish and rock bass) of at least six inches in length, it is conceivable that some edible food could be obtained from a panfish as small as 4 inches. Whereas the more slender body of a white sucker of only 4 inches in length would yield considerably less edible mass. CBS continues to recommend that six inches be considered the minimum edible fish size.

Second, the Tetra Tech analysis indicates that the productivity of this reach can only support the estimated fish consumption rates for a single fish consumer without impacting the sustainability of the fishery. While as noted above, CBS still feels that consumption rate for even this single consumer is overestimated it is not typical risk assessment practice to base risk estimates on maximum exposures to a single individual. While Appendix A acknowledges this approach, this important limitation is not presented in the main body of the risk assessment. It is important that, if U.S. EPA continues to use this approach, this limitation be presented more directly so that risk managers will be able to consider this important factor in their decision-making concerning potential remedial activities.

Consideration of the quality of the fishery and information about recreational fish consumption rates from rivers and streams indicate that the estimated fish consumption rates that are being applied in the revised HHRA are not appropriate for this area. In addition, if more than one individual were to harvest and consume fish from this reach at the assumed rates, the result would be the depletion of the resource so that no fishing could occur there.

As discussed in previous comments on the HHRA for Neal's Landfill (CBS, 2004; 2005), the available fish consumption literature indicates that, for small streams, fish consumption rates in the range of 1 to 4 g/day would likely be appropriate, while in larger rivers and streams, the range of consumption rates is likely to be 1 to 12 g/day. At the 1-Mile Site, the Tetra Tech derived productivity can only support a maximum rate of 6 g/day for pelagic fish and 4 g/day for benthic fish for a single individual. While it is questionable whether any substantial amount of fishing occurs in this area, it is likely that if it does occur, more than one individual would be involved. If a total of 10 individuals fished this area each year, then the maximum sustainable rate per person would be 0.6 g/day for pelagic fish and 0.4 g/day for benthic fish, or a total of 1 g/day for each individual. It is recommended that this maximum sustainable rate be used to evaluate the 1-Mile Site. This rate is consistent with the median fish consumption rates reported for rivers and streams in the Maine angler survey (Ebert et al., 1993). It is important to note, however, that the median rate of 1 g/day that was reported in the Maine survey was based on fishing that occurred in considerably larger and more productive rivers and streams. Thus, even this rate is likely to overestimate consumption from the 1-Mile Site.

In attempting to derive more realistic fish consumption rates for the downstream reaches, in the absence of specific productivity information for them, U.S. EPA has assumed that there is a 10 percent increase in the fish consumption rate per river mile. There is no scientific justification for making this assumption as distance downstream will not be the determining factor in rates of fish consumption. Many factors, including accessibility, habitat, availability of desirable species, and availability of alternative fisheries have a substantial impact on the likelihood that individuals will use and consume fish from a particular fishery.

Rather than making unfounded assumptions about downstream productivity, it is recommended that U.S. EPA select fish consumption rates from the published literature

for similar types of waterbodies. As discussed above, Ebert et al. (1993) provided recreational fish consumption rates for fish obtained from rivers and streams in Maine. The median rate was 1 g/day, the arithmetic mean rate was 6.4 g/day, and the 95th percentile rate was 12 g/day. Given that these rates are based on fish obtained by individual anglers who obtained fish from multiple, larger, and more desirable fisheries than are being evaluated for Richland Creek, it is unlikely that these rates would underestimate consumption from the Richland Creek reaches being evaluated. In addition, in its National Sludge Rule, U.S. EPA recommended the use of rates of 1 to 4 g/day to evaluate smaller waterbodies (U.S. EPA, 2003). Thus, it is recommended that the rate of 1 g/day be used as a maximum rate for the 1-Mile Site, a rate of 4 g/day be used for the 3-Mile site, a rate of 6.4 g/day be used for the 5.5-Mile Site, and a rate of 12 g/day be used to evaluate the 12.7-Mile Site.

Response 37: CBS states that U.S. EPA continues to maintain that anglers may catch and ingest fish as small as 4 inches in length; therefore, fish as small as 4-inches in length will continue to be considered "harvestable." U.S. EPA acknowledges uncertainties associated with this definition of "harvestable" fish. For example, the sustainable fish tissue ingestion rate in each reach may be overstated to a degree based on inclusion of the biomass associated with fish between the size of 4 and 6 inches in length. Also, U.S. EPA is aware of the different body types of different species of fish. There is greater uncertainty associated with the assumption that a similar amount of edible tissue can be obtained from some fish (for example, sunfish and rock bass) as compared to others (for example, white sucker). The HHRA will be revised to discuss these uncertainties.

The HHRA will also be revised to clarify that exposures, risks, and hazards associated with fish tissue ingestion are applicable only to a small number of individuals. Accordingly, because the available fish tissue biomass in Richland Creek may only support a small number (as low as one) of anglers, the majority of individuals that are exposed in and along the North and South Springs, Conard's Branch, and Richland Creek are not likely to also ingest fish from Richland Creek. Therefore, the revised HHRA calculations include two types of total risks and hazards: (1) totals for all relevant exposure pathways including sediment, soil, surface water, and fish tissue ingestion and (2) totals based only on all relevant sediment, soil, and surface water exposures.

Finally, the assumption that fish biomass (and, therefore, potential fish tissue ingestion) will increase by 10 percent per river mile is based on the observed increase in size (for example, in width and flow rate) of Richland Creek as the distance downstream from Neal's Landfill increases. It is a well established point that, all things being equal, a larger stream will support a larger fish population than a smaller stream. U.S. EPA believes that in the absence of fish population estimates at downstream locations, the approach used produces reasonably conservative estimates of fish productivity that recognize the likely increase in fish biomass in Richland Creek downstream of Neal's Landfill. Uncertainties associated with the downstream fish tissue ingestion rates calculated based on the 10 percent assumption will be discussed in the HHRA.

In conclusion, U.S. EPA will continue to use the reach-specific fish tissue ingestion rates as presented in the HHRA.

Comment 38: CBS states that the fish tissue EPCs used for some locations of Richland Creek are highly uncertain due to the fact that they are based on an extremely limited number of samples. For example, in the 3-Mile reach, the total PCB EPC for pelagic fish is based on only three fish samples and the total PCB EPC for benthic fish is based on only five fish tissue samples. The EPCs for TEQ are based on even more limited data with only one sample available for pelagic fish and one sample available for benthic fish collected from the 3-Mile reach. At the 5.5-Mile reach, there are no fish tissue data available for PCBs or TEQ in pelagic fish, which are the fish that are most likely to be consumed. The only data available are for eight benthic fish that were collected.

In addition, Tetra Tech has calculated TEQ concentrations for fish tissue samples that were analyzed for PCB congeners. However, these calculated TEQ concentrations do not incorporate the most current TEF approach recommended by the WHO (van den Berg et al., 2006). In its revised recommendations for TEF, WHO has modified its recommended TEF for a number of PCB congeners. Based on the revised approach, CBS has recalculated the TEQ concentrations for all of the fish tissue scenarios evaluated. The revised TEQ concentrations are shown below and compared with the original values used by Tetra Tech.

Reach	Type of Fish	EPA Reported TEQ (ng/kg)	CBS Recalculated TEQ (ng/kg)
1-Mile	Pelagic	3.5	3.5
1-Mile	Benthic	8	9.3
3-Mile	Pelagic	1.4	1.0
3-Mile	Benthic	2.3	1.4
5.5-Mile	Pelagic	NE	NE
5.5-Mile	Benthic	3.3	2.3
12.7-Mile	Pelagic	NE	NE
12.7-Mile	Benthic	NE	NE

NE = Not evaluated by Tetra Tech.

Finally, Tetra Tech has based its benthic fish tissue EPCs for the 1-Mile Site on the fish tissue data for white suckers. As was discussed in previous comments on the draft HHRA that were submitted by CBS (2004; 2005), it is extremely unlikely that white sucker will be consumed. In fact, the productivity study conducted by CBS at the 1-Mile Site found that sucker constituted less than twenty percent of the fish biomass (52.5 kg/hectare) for fish that might be harvested for consumption (e.g., rock bass, yellow bullhead, white sucker and green sunfish). Thus, it is very unlikely that sucker would be exclusively harvested and consumed from this reach (Christian, 2006).

In its HHRA conducted for the Lemon Lane Landfill Site, U.S. EPA acknowledged that white sucker are "generally less desirable for consumption" than sunfish and that "white sucker are generally expected to make up a small portion of a typical angler's diet" (Tetra

Tech, 2006b). In that report, however, U.S. EPA stated that some anglers may be more opportunistic and thus may ingest a higher proportion of sucker. While this might be true *if* sucker were the only fish available in Richland Creek, this is not the case. Opportunistic anglers catch and consume the fish that they can catch most easily. In the case of Richland Creek, an opportunistic angler may catch and consume both pelagic fish and benthic fish but it is highly unlikely that that individual will preferentially consume sucker, given the higher available biomass of other, more desirable species. Instead if there are individuals who do consume any sucker, they also likely consume other available species. This information needs to be discussed in the risk characterization to provide perspective on the risk estimates that are presented based on the exclusive consumption of sucker.

Response 38: U.S. EPA acknowledges limitations in the number of fish tissue samples available to calculate EPCs at specific locations. The HHRA already discusses limitations associated with small numbers of samples. This discussion will be reviewed and revised as necessary. U.S. EPA acknowledges that the TEFs used in the HHRA have been updated. At the time the HHRA was prepared, the TEFs used represented the most up-to-date values. U.S. EPA will revise the TEQ calculations in the HHRA to incorporate the most recent TEFs (Van den Berg and others 2006).

Finally, U.S. EPA acknowledges the fact that white suckers are "generally less desirable for consumption than sunfish and that white sucker are generally expected to make up a small portion of a typical angler's diet." Consistent with revisions made previously to the Lemon Lane Landfill HHRA, U.S. EPA will revise the benthic fish tissue ingestion rate to reflect relative presence of benthic fish in the total biomass of Richland Creek. As noted in CBS's comment, white suckers make up "less than 20 percent" of the total biomass at the 1-Mile Site. Therefore, fish tissue ingestion rates at all reaches considered in the HHRA will be modified to reflect a relative presence of 80 and 20 percent pelagic and benthic fish, respectively, in the total biomass. So, for example, at the 1-Mile Site a pelagic fish tissue ingestion rate of 6 g/day was calculated (see Table A-1 in Attachment 2). If 6 g/day represents 80 percent of the total ingestion rate, then a benthic fish tissue ingestion rate of 1.5 g/day represents the remaining 20 percent. This represents a reduction of more than 60 percent in the benthic fish tissue ingestion rate.

Comment 39: CBS states that ss discussed in previous comments to U.S. EPA on the HHRA for the Site (CBS, 2004; 2005), there is considerable uncertainty associated with the use of dioxin TEQ to evaluate PCB congeners, including the uncertainties associated with the application of individual toxic equivalence factors, as well as the uncertainty associated with the selection of a cancer slope factor for dioxin. These uncertainties and the scientific validity of the entire approach have been the subjects of considerable debate among members of the scientific community and were a primary focus of the review of U.S. EPA's Dioxin Reassessment, which was conducted by the National Academy of Sciences (NAS).

A recent report by the NAS, subsequent to its review of the draft Dioxin Reassessment, noted that only four of the 12 PCB congeners for which WHO has developed TEFs were

included in the Dioxin Reassessment and thus were evaluated by the NAS (NAS, 2006, p. 53). The NAS report did not consider the other eight PCB congeners "because of concerns about the accuracy of previous in vivo and in vitro toxicological (relative potency) results." The NAS also concluded that the use of TEQ to estimate toxicity in humans may be inaccurate or incorrect due to the fact that the TEFs have been developed to evaluate the relative toxic potency of a mixture to which an animal is directly exposed by dietary intake but may not be an appropriate measure for internal TEQ concentrations and potential toxic effects (NAS, 2006, p. 61).

The NAS report also cast substantial doubt on the use of the current cancer slope factor (CSF) for dioxin to establish potential cancer risks due to TEQ. The NAS committee unanimously concluded that the current weight of scientific evidence favors the use of a non-linear model for extrapolating carcinogenic effects of dioxin-like compounds at low doses (p. 135). However, in accordance with current U.S. EPA policy, the CSF of 150,000 $(mg/kg\text{-}day)^{-1}$, which was used to evaluate potential risks due to the presence of these congeners in fish from Richland Creek, is based on a linear non-threshold model. This issue makes the use of the alternative CSF of 1.5E-06 $(mg/kg\text{-}day)^{-1}$ presented in the risk results even more uncertain.

Finally, the HHRA has reported the results of an evaluation of the noncarcinogenic hazards posed by the "dioxin-like" PCB congeners, using a reference dose of 1 pg/kg-day, based on the value it states was proposed in U.S. EPA's draft Dioxin Reassessment. However, the draft Dioxin Reassessment does not recommend or propose a reference dose for dioxin or dioxin-like compounds and U.S. EPA has never published a reference dose for dioxin in either its Integrated Risk Information System (IRIS) or Health Effects Assessment Summary Tables (HEAST). While U.S. EPA used an allowable daily intake of 1 pg/kg-day to derive its ambient water quality criterion in 1984, and other agencies such as the Agency for Toxic Substance and Disease Registry (ATSDR) have derived allowable concentrations based on non-carcinogenic effects, U.S. EPA does not discuss noncarcinogenic potential in IRIS or in HEAST. In addition, the screening Risk-Based Concentrations derived by U.S. EPA Region III and Preliminary Remediation Goals derived by U.S. EPA Region IX, which are commonly used as screening values, do not consider the noncarcinogenic potential for dioxins and provide no reference dose (even a provisional reference dose from NCEA). Consequently, CBS recommends that the evaluation of noncarcinogenic effects due to TEQs be removed from the HHRA.

Due to the uncertainties associated with the evaluation of TEQ, both for the cancer and noncancer endpoints, CBS recommends that all TEQ analyses be eliminated from the HHRA. Such an analysis is unnecessary and contributes greatly to the overall uncertainty associated with the reported results of the HHRA.

Response 39: U.S. EPA is aware that there is uncertainty associated with use of dioxin toxicity equivalents (TEQ) to evaluate PCB congeners. However, as stated in the HHRA, U.S. EPA recognizes that the use of the TEQ methodology as an official policy is still under review, and that dioxin toxicity was reviewed by the NAS. U.S. EPA acknowledges the concerns raised during the NAS review regarding use of the TEQ

approach. Nonetheless, the TEQ methodology continues to be "widely applied in peer-reviewed published literature" (U.S. EPA 2004c). While acknowledging uncertainties associated with use of the TEQ methodology, the presence of these uncertainties does not warrant dropping the TEQ methodology entirely (U.S. EPA 2004b). U.S. EPA will continue to apply the TEQ methodology, albeit with updated TEFs [Van den Berg and others 2006]). However, U.S. EPA will expand its discussion of the uncertainties associated with use of the TEQ methodology to include some of the concerns raised by the NAS review.

U.S. EPA also acknowledges that the NAS favors use of a non-linear model for extrapolating carcinogenic effects of dioxin-like compounds at low doses. However, as noted above, the current CSF of 1.5E+05 $(mg/kg\text{-}day)^{-1}$ and the proposed CSF of 1E+06 $(mg/kg\text{-}day)^{-1}$ (both based on an assumed linear mode of action) were used to characterize carcinogenic risks associated with potential exposure to PCBs. U.S. EPA will continue to use these CSF values to characterize PCB carcinogenic risks. However, uncertainties associated with using CSFs based on a linear mode of action will be discussed in light of PCB's potentially non-linear mode of action.

With regard to the dioxin RfD of 1 pg/kg-day used in the HHRA to evaluate hazards associated with potential exposure to dioxin-like PCBs, U.S. EPA continues to assert that the scientific validity of the 1 pg/kg-day value has undergone significant peer review (U.S. EPA 1984, ATSDR 1998). The fact that (1) U.S. EPA has not discussed noncarcinogenic effects of dioxin in IRIS or HEAST and (2) U.S. EPA Region 3 RBCs and Region 9 PRGs do not consider noncarcinogenic potential for dioxins is an insufficient basis for removing consideration of the potential noncarcinogenic effects of dioxin-like PCBs from the HHRA. As noted in response to previous comments on the risk assessment prepared for the Lemon Lane Landfill, it is U.S. EPA policy to use previous toxicological values and policies until toxicity factors (including RfDs) are finalized.

Comment 40: CBS states that U.S. EPA has used an exposure duration of 30 years for the fish consumption pathway. While it is conceivable that an individual could fish Richland Creek every year for 30 years, it is highly unlikely that this would occur, even if the individual were to reside in the area for that period of time. Instead, an individual who regularly fishes from year to year is likely to be an avid sport angler who will visit higher quality fisheries during regular fishing trips.

Although it is highly unlikely that an individual will fish the Site for this extended period of time, it is possible that it could occur. However, it appears that the EPCs for fish tissues, which are based on recent sampling data, are not accurate predictors of the PCB concentrations to which fish consumers would be exposed over a 30-year period. The trend analysis conducted by QEA on behalf of CBS (QEA, 2006) indicates that PCB concentrations in fish tissues have been declining at a rate of approximately four percent per year. At this rate of decline, the 30-year average fish tissue concentrations would be substantially lower than the current concentrations, which have been used as the basis for estimating potential risks due to the fish consumption pathway. Thus, the HHRA should

clearly note that fish tissue concentrations are declining and that the use of current fish tissue concentrations in combination with an assumed exposure duration of 30 years is a highly conservative approach and likely overstates the potential for cancer risk.

Response 40: U.S. EPA's use of a 30-year exposure duration is consistent with long-established residential exposure duration under RME conditions. An individual angler may fish a particular stream or a particular stretch of a stream for a variety of different reasons; in fact, these reasons may change during different periods of that angler's life. For example, an angler may fish in a particular stream (for example, Richland Creek) based on its convenient location. Later in life, that same angler may continue to fish in Richland Creek for nostalgic reasons; they have fished there in the past and may consider fishing in Richland Creek to be relaxing and comforting. U.S. EPA has never asserted that anglers fish exclusively in Richland Creek. As suggested in CBS's comment, an avid sport angler may fish in higher quality fisheries in addition to Richland Creek. However, U.S. EPA maintains that the assumption that an angler may fish in Richland Creek to the extent necessary to meet the assumed fish tissue ingestion rates over a 30-year exposure duration is consistent with RME conditions.

U.S. EPA acknowledges that use of fish tissue EPCs based on recent fish tissue data is a conservative estimate of the fish tissue EPC to which anglers may be exposed over a 30-year period. There is evidence that PCB concentrations in fish tissues have been and are expected to continue to decrease. Nonetheless, the use of current fish tissue results to estimate fish tissue EPCs is consistent with standard industry practices and U.S. EPA guidance. U.S. EPA will discuss the on-going gradual decline in fish tissue concentrations and the fact that calculating exposures, risks, and hazards using fish tissue EPCs based on current fish tissue analytical data likely results in exposures, risks, and hazards being overestimated.

Comment 41: CBS states that the HHRA has concluded that direct contact with surface water provides the greatest potential for exposure due to the direct contact pathways. However, these estimates of exposure are exaggerated due to the assumptions that have been used to derive them. The overestimated exposure assumptions include the use of the maximum detected concentration at each location, inflated assumptions about exposure frequency, exposure time, and frequency of water ingestion, and an unlikely dermal surface area.

Response 41: U.S. EPA will respond individually to comments regarding (1) the EPC for surface water, (2) exposure frequency, and (3) dermal surface area.

Comment 42: CBS states that the surface water data upon which the EPCs have been based exclude a number of surface water samples that have been collected at RCVP and RC43. While Table B-12 in Appendix B reports a total of 3 samples at RC43 and 4 samples at RCVP, there are over 60 surface water sample results available for each of these stations. CBS acknowledges that the majority of those surface water sample results were taken during storm conditions and thus are not likely to be representative of the levels of PCBs to which individuals may be exposed since it is not likely that people will

visit these sites during significant rain events. However, there have been a few non-storm event samples taken at these locations since the 1999 source control remedy. These include the following:

Station ID	Sample ID	Date	Result	Units	Entity	Occasion
RCVP	NL 1893	11/14/02	0.014	ppb	CBS	Fish sampling
RCVP	RC 0019	5/27/03	0.013	ppb	CBS	Fish sampling
RCVP	NL 4410	3/26/04	<0.1	ppb	CBS	Pre-storm sampling
RCVP	NL 4491	4/16/04	<0.02	ppb	CBS	Low flow testing
RCVP	NL 4492	4/16/04	<0.02	ppb	CBS	Low flow testing
RC43	NLH 0756	8/1/01	<0.1	ppb	EPA	Fish sampling
RC43	NL 4437	3/26/04	<0.1	ppb	CBS	Pre-storm sampling

CBS requests that U.S. EPA consider all of the available, relevant surface water data in developing its EPCs for the surface water contact pathways.

Tetra Tech (2006) has based its surface water EPCs for the 1-Mile and 3-Mile Sites on the maximum surface water concentration at each location, despite the fact that there were a number of non-detect concentrations at each location and the long-term average concentrations were considerably lower. The maximum concentration was used because there were too few samples to calculate an upper confidence limit on the arithmetic mean (UCL). However, it is important to note that the use of a maximum concentration is not representative of the long-term surface water concentration to which recreationalists might be exposed. Instead, when one is considering long-term exposures, the average concentrations measured over time are most relevant, as has been acknowledged by U.S. EPA.

Using the analytical results for all of the relevant surface water samples collected at the 1-Mile and 3-Mile Sites, and assuming that concentrations listed as non-detect are present at half of their reported detection limits, the resulting arithmetic mean EPCs would be 0.046 µg/L for the 1-Mile Site and 0.09 µg/L for the 3-Mile Site. It is recommended that these values be used as the EPCs for the surface water pathways in these areas.

Response 42: As stated in Section 2.1.2, surface water analytical data collected in 2004 and 2005 were used as the basis for the surface water EPCs at the RCVP and RC43 locations. Therefore, a total of three of the results listed above in the CBS comment were not included because they were collected prior to 2004. The other results listed for the RCVP and RC43 locations were in fact considered in calculating the surface water EPCs for these locations. The confusion may have been that the significant majority of surface water samples collected at these two locations were collected as part of hourly or nearly hourly samples collected over one-day periods. For example, the RCVP sample with the ID NL 4410 was collected on March 26, 2004, at 1600 hours. Other samples were collected the same day at almost hourly intervals at this same location. For example, sample NL 4438 was collected at 1400 hours and sample NL 4439 was collected at 1500

hours. In order to not overly weight results collected on such a frequent basis (in order to better estimate long-term average concentrations), all samples collected on a single day were averaged. As noted in CBS's comment, because of the small sample number, the EPC was set equal to the highest detected concentration (0.104 ug/L). However, it is important to note that if the available results are first averaged for each day on which samples were collected and then these daily averages are, in turn, averaged, the overall average surface water concentration is 0.102 ug/L and not 0.046 ug/L as suggested by CBS. Similarly, the overall average calculated for the RC43 location is 0.12 ug/L and not 0.09 ug/L as suggested by CBS.

As presented in the EDMS (CBS 2006a), the significant majority of surface water analytical results for the RCVP and RC43 locations are reported as nondetect at a detection limit of 0.2 ug/L; one-half of this value is 0.1. Therefore, it is reasonable for a long-term average surface water concentration to be slightly above 0.1 ug/L.

All available surface water analytical results from 2004 and 2005 were considered in calculating surface water EPCs for the RCVP and RC43 locations. The surface water EPCs used in the HHRA 0.104 ug/L (RCVP) and 0.15 ug/L (RC43) are similar to the overall averages calculated for these locations: 0.102 ug/L (RCVP) and 0.12 ug/L (RC43). These small differences will make little difference in the calculated exposures, risks, and hazards. Therefore, surface water EPCs for the RCVP and RC43 locations will not be revised; the EPCs will remain as presented in the HHRA.

Comment 43: CBS states that the HHRA uses extremely high exposure frequencies of 34 days/year (adults) and 51 days/year (children and youths) to evaluate the surface water exposure pathways for the North and South Springs and all portions of Conard's Branch. For all reaches of Richland Creek, the exposure frequency is assumed to be 68 days/year. This frequency is based on the assumption that adult and youth recreationalists will spend 4 days per week for 13 weeks, from June through August, and 4 days per month at each Site during April, May, September, and October.

While it is plausible that individuals could occasionally visit the North and South Springs or Conard's Branch, it is not likely that they will visit them, even at the reduced frequency that has been assumed by U.S. EPA. There is no indication that this intensity of recreational activity is currently occurring in these areas or would be likely to occur in the future, given the characteristics of the waterbodies. U.S. EPA has acknowledged that individuals are not likely to visit these areas, due to their physical characteristics and accessibility. In fact, given these characteristics, it is very unlikely that individuals will spend any recreational time in these areas. The springs are shallow and are located at some distance from public roads, making regular access unlikely. In addition, Tetra Tech (2003b) reports that Conard's Branch has very limited access, the 3 to 5 foot banks are steeply incised and, with the exception of one large pool, the remainder of the reach ranges in width from 1 to 3 feet and is less than 6 to 12 inches deep. As a result, it is very unlikely that these areas are used for recreational purposes with any regularity.

Similarly, the 1-Mile Site is less than 2 feet deep and the reach ranges from 10 to 30 feet in width. This area does, however, have some side, channel and point gravel bars, and can be accessed more easily from the road, making it a somewhat more desirable recreational location. While there are very few houses nearby, it is possible that residents could occasionally access this area for some type of activity. Thus, while U.S. EPA's exposure frequency of 68 days/year is very conservative, given that surface water contact is only likely to occur during the summer months, it is still plausible.

As shown in the *Data Validation Review of Neal's Landfill Fish Samples November 2003 Validation* (Tetra Tech, 2004), the banks of the 3-Mile Site are steep in most locations and heavily overgrown with brush and woody debris, making access difficult. As a result, it is unlikely that individuals regularly visit this area and have water contact there, as has been assumed in the HHRA. Similarly, the 5-Mile Site of Richland Creek consists of an upper reach that has deep pools containing woody debris with heavily overgrown banks, making this type of exposure less likely in this area. Thus, while it is not impossible for individuals to have contact with surface water in these areas, it is highly unlikely that young children will participate in these activities in such areas, and very likely that these activities will occur with much less frequency than 68 days/year.

CBS recommends that reduced exposure frequencies be evaluated for the surface water pathways in most areas. For the North and South Springs and the reaches of Conard's Branch, it is recommended that no more than 12 days of exposure be evaluated. This equates to a visit to each area occurring one day each week during the warmest months of the year.

The higher exposure frequency of 68 days/year for surface water contact at the 1-Mile Site is conservative but plausible, given its proximity to a few residences and its greater accessibility. However, at the 3-Mile and 5.5-Mile Sites, it is not likely that surface water contact will occur more than 1 or 2 days/week during the summer months. Thus, for these reaches, an exposure frequency of 24 days/year is recommended.

Response 43: As noted by CBS, an exposure frequency of 68 days/year is plausible for the 1-Mile Site; therefore, no changes will be made to the exposure frequency for this location.

U.S. EPA acknowledges that the North and South Springs and Conard's Branch are unlikely to be visited often based on their physical characteristics and accessibility. CBS recommends an exposure frequency of 12 days/year (based on 1 day/week during the summer). However, exposure may not be limited to only the summer months. Therefore, an exposure frequency for all receptors of about 1 day/week during the summer and two days per month in the fall and spring (April, May, September, and October) or 20 days/year is more reasonable for these locations. The HHRA will be revised accordingly.

U.S. EPA acknowledges that Section E (beginning at the 3-Mile Site and extending more than 1.5 miles downstream) and Section F (beginning at the downstream end of Section

E, extending about 1.5 miles downstream, and including the 5.5-Mile Site) are more remote and are heavily overgrown with brush and woody debris. Therefore, access to these locations is expected to be less than at Section C which includes the 1-Mile Site. CBS recommends an exposure frequency of 24 days/year (based on 2 days/week during the summer months). However, exposure may not be limited to only the summer months. For the Lemon Lane Landfill, CBS recommended an exposure frequency "in the range of 1 day per week during the warmer months of the year, or 30 days/year, for less accessible reaches. In order to both reflect the lower expected frequency of exposure at Sections E and F and to maintain some consistency between risk assessments prepared for nearby sites, an exposure frequency of 30 days/year will be applied to Sections E (including the 3-Mile Site) and F. The HHRA will be revised accordingly.

Finally, U.S. EPA notes CBS's concern that young children are very unlikely to access Richland Creek at Section F which includes the 5.5-Mile Site. However, in order to be health protective, U.S. EPA will continue to assume young children may be exposed in Richland Creek at Section F, although the HHRA will be revised to discuss the factors that may significantly reduce or eliminate potential exposure to surface water by young children at Section F.

Comment 44: CBS states that U.S. EPA has assumed that wading occurs at the North and South Springs, all sections of Conard's Branch, and all of Richland Creek. In addition, U.S. EPA has assumed that young children swim during 50 percent of their summer exposure events in Section F. In deriving dermal surface areas, U.S. EPA has used variable depth information to determine what portions of the feet and legs might be exposed. While this approach reflects the specific physical characteristics of the water bodies being evaluated, it does not reflect the type of wading activity that is likely to occur on a regular basis. In fact, the depth of water available does not reflect the depth to which people are likely to wade. In most cases, when individuals are wading, they will not wade to a depth greater than knee height due to the fact that deeper wading may result in loss of balance. Thus, while CBS agrees with using the assumed surface areas for the North Spring, South Spring, and Sections Pre-A, A, and B, it believes that the feet and lower legs should be the maximally exposed dermal surface area during wading in the remainder of the reaches. Thus, for young children, older children and adults who wade, the skin surface areas in these areas would be 1,101, 2,559, and 3,595 cm^2, respectively.

It should also be noted, however, that adults and high-school aged adolescents are not likely to wade in these areas on a regular basis. While it may be reasonable to assume that young children and pre-adolescents between the ages of 7 and 13 years might be engaged in recreational activities that would involve regular wading, once children reach high-school age, regular activity of this type of activity is likely to lose its appeal. As a result, the assumption that these behaviors occur every year for 12 years is likely to substantially overestimate exposure to those individuals. This additional level of conservatism should be discussed in the risk characterization of the HHRA.

Response 44: CBS expressed no disagreement with receptor-specific surface areas used for the North and South Springs, and Sections Pre-A, A, and B; therefore, the values used in the HHRA will remain unchanged.

U.S. EPA agrees that individuals are not likely to regularly wade in water over their knees. Therefore, the skin surface areas for young children, youths, and adults are 1,101, 2,559, and 3,595 cm^2, respectively, for receptors wading in Sections C, D, and E based on exposure to feet and lower legs. It was assumed that young children will swim on 50 percent of the summer days in Section F. Therefore, the total surface area assumed for young children in Section F was calculated as shown:

$$(6{,}560\ cm^2 \times 6.5/30) + (1{,}101\ cm^2 \times 23.5/30) = 2{,}284\ cm^2$$

The skin surface areas for youths and adults wading in Section F are the same as those listed above for Sections C, D, and E.

Comment 45: CBS states U.S. EPA has used an exposure time of 2 hours/day to evaluate dermal exposure to surface water. This is a highly inflated estimate of the amount of time that individuals are likely to wade at the Site, particularly when considered in light of the high exposure frequencies used in the assessment. It is unlikely that an individual would spend this much time in the water during each exposure event. This is particularly true for older youths and adults who are not likely to spend substantial amounts of time in the water, even when visiting the creek.

Given the size of the water bodies and their limited appeals as recreational locations, it seems more realistic to assume that an individual spends no more than one hour in contact with the surface water during every exposure event. In its response to CBS's comments on the risk assessments for Bennett's Dump and Lemon Lane Landfill sites, U.S. EPA has acknowledged that its assumption of 2 hours is conservative and they indicated that they planned to revise the exposure time assumption in those risk assessments from 2 hours per day to 1 hour per day. CBS recommends that this same revision be made for the Neal's Landfill HHRA. Even this assumption would be likely to overestimate potential for contact for this exposure pathway.

Response 45: U.S. EPA acknowledges that the assumption that individuals are exposed for 2 hours/day on each day of exposure is conservative. Therefore, U.S. EPA is revising its exposure time assumption from 2 to 1 hour/day. Exposures, risks, and hazards associated with dermal exposure to surface water will be revised accordingly.

Comment 46: CBS states U.S. EPA has selected a water ingestion rate of 0.0382 L/day for adults and 0.0765 L/day for youths, based on swimming. They have derived these water ingestion rates by using the incidental ingestion of 0.05 L/hour (U.S. EPA, 1997) for an exposure time of 2 hours to derive a total of 0.1 L/day. For youths, they have assumed that individuals will only ingest water during the summer months (13 weeks or 52 visits if there is a visit four days/week) and thus have adjusted the ingestion rate by a factor of 52/68 so that they can combine this ingestion rate with a frequency of 68

days/year to derive their water ingestion rate. U.S. EPA has then assumed that adults will ingest water for approximately half of the time that youth receptors will. This approach is unnecessarily convoluted and does not reflect potential for exposure due to this pathway.

Surface water ingestion is only likely to occur if an individual is swimming or becomes submerged in the water and accidentally ingests some water. The depth of water in the North and South Springs and in Conard's Branch is too low to permit swimming or to result in submersion. As a result, the surface water ingestion pathways should be eliminated altogether from the HHRA for these reaches.

U.S. EPA has clearly acknowledged that swimming is not likely to occur in most portions of Richland Creek. If this is the case, then the only opportunity for an individual to ingest water would be if they were to fall, become submerged, and accidentally ingest surface water. It would not be anticipated that this accidental exposure would happen every time an individual visits the creek. Instead, it is possible that this type of accidental exposure might occur one or two times per year. Thus, CBS recommends that an surface water ingestion exposure frequency of 2 events/year be combined with a water ingestion rate of 50 mL/event to estimate exposures due to this pathway. This will represent more realistic estimates of exposures due to the accidental ingestion of surface water.

Response 46: U.S. EPA agrees that the approach used to calculate the rate of potential surface water ingestion rate was overly complex. Further because the methodology assumed exposure during swimming (an activity that was not assumed to occur in the North and South Springs and in Conard's Branch, and in much of Richland Creek, this approach did not adequately reflect site-specific conditions.

However, U.S. EPA disagrees with CBS's assertion that "surface water ingestion is only likely to occur if an individual is swimming or becomes submerged in the water and accidentally ingests some water." Individuals recreating in or along the North and South Springs, Conard's Branch, and Richland Creek may ingest surface water by scooping water from the creek to their mouth. One fluid ounce of water is equivalent to 29.6 milliliters (mL). U.S. EPA considers one fluid ounce to be a reasonable amount of water to assume an individual ingests to temporarily alleviate a thirst they may have especially on warmer days. U.S. EPA also assumes that children and youths may ingest water in this fashion on 50 percent of the days they are assumed to recreate in or along the North and South Springs, Conard's Branch, and Richland Creek. Adults are assumed to ingest water from the creek half as often as children and youths (about 25 percent of the days they are assumed to recreate in or along the North and South Springs, Conard's Branch, and Richland Creek). Therefore, receptor-specific revised surface water ingestion rates are calculated below.

Children and Youths

$$(0.030 \text{ L/day} \times 0.5) = 0.015 \text{ L/day}$$

Adults

(0.030 L/day x 0.25) = 0.0075 L/day

Receptor-specific surface water ingestion exposures will be adjusted accordingly.

Comment 47: CBS states U.S. EPA has also overestimated exposures and risks due to contact with bank and floodplain soils due to the use of high exposure frequencies, high dermal surface areas, and an unreasonably high estimate of soil ingestion by 7-18 year old youths.

As with the surface waters of the North Spring, South Spring, and Conard's Branch, it is very unlikely that individuals will regularly visit these areas and have contact with bank or floodplain soil. U.S. EPA has reduced its exposure frequency for Conard's Branch to reflect its limited accessibility and lower desirability as a recreational area. However, even the exposure frequencies of 38 days/year for adults and 57 days/year for youths and children substantially overestimate the likely frequency with which these areas will be visited or contacted. In addition, it does not appear that U.S. EPA has made any adjustments for lower frequencies that would be expected at the North and South Springs.

CBS asserts that there is little potential for actual contact with bank and floodplain soils at either of the springs or at any point along Conard's Branch. Thus, it recommends that a reduced exposure frequency of 12 days/year, representing one visit per month during the summer months, be used for these areas. For the 1-Mile Site, the assumed frequency of 76 days/year may be plausible given its proximity to a few residences. However, in the downstream reaches, there is no reason to assume that contact with soils will occur with more frequency than will contact with surface water. Thus a revised exposure frequency of 24 day/year is also recommended for these exposure pathways in those areas.

In addition, the HHRA has used an upper bound soil ingestion rate of 200 mg/day for youths, despite the acknowledgement in its guidance (U.S. EPA, 1997) that the more intensive soil ingestion, which is sometimes demonstrated in young children, ceases to occur by the age of six. Generally, risk assessments assume that an upper bound estimate of 100 mg/day is appropriate for older children and adults alike (U.S. EPA, 1997; 2002). Thus, CBS recommends that this exposure assumption be reduced accordingly.

Finally, the evaluation of exposure due to surface soil, bank soil, and floodplain soil contact assumes that 100 percent of the soil ingested and contacted on a daily basis will be contaminated soil. In fact, soils from the contaminated areas are likely to represent a very small fraction of the total incidental soil ingested daily, which will include a majority of soils from non-contaminated areas (i.e., away from the banks and outside of flood plain areas). As a result, it is not reasonable to assume that 100 percent of the soils contacted on each day of exposure will be contaminated soil. Given the relatively small sizes of the floodplain areas and bank soil areas, it is reasonable to assume that no more than half of the soil contacted daily will be derived from contaminated areas. Thus CBS

recommends that an additional factor of 50 percent be used in calculating potential exposures due to soil contact.

Response 47: U.S. EPA acknowledges that the North and South Springs and Conard's Branch are unlikely to be visited often based on their physical characteristics and accessibility. CBS recommends an exposure frequency of 12 days/year (based on 1 day/week during the summer). However, exposure may not be limited to only the summer months. Therefore, an exposure frequency for all receptors of about 1 day/week during the summer and two days per month in the fall and spring (April, May, September, and October) or 20 days/year is more reasonable for these locations. The HHRA will be revised accordingly.

For Sections B and C, the exposure frequency of 76 days/year was acknowledged by CBS as plausible. Therefore, this exposure frequency will remain unchanged for these reaches. Access to Section D is assumed to be similar to that assumed for Section C. Specifically, several homes are located along Section D and the 3-Mile Site (the downstream end of Section D) also provides ready access to Richland Creek. Therefore, the exposure frequency of 76 days/year will be retained for Section D.

For more downstream locations (Section E; no soil data is available for Sections F and G), U.S. EPA agrees that potential exposure to soil will occur at a similar frequency as assumed for surface water given the limited accessibility of these reaches. Therefore, potential exposure to soil at Section E (including the 3-Mile Site) is assumed to occur at a frequency of 30 days/year.

U.S. EPA acknowledges that as a group, the soil ingestion rate for youths (7 to 18 years) may be better represented by the rates used for adults, rather than the rates for younger children. Therefore, the risk assessment will be revised to use a soil ingestion rate of 100 mg/kg for youths (7 to 18 years).

Finally, U.S. EPA acknowledges that it is unlikely that all of the soil contacted by receptors will be from site-contaminated areas. Therefore, all receptor-specific soil exposures will be adjusted to incorporate a "fraction contaminated" factor of 50 percent.

Comment 48: CBS states that while the sediment contact pathways are not important pathways in terms of their contribution to total risks, the risk estimates for this pathway are overstated. This is because the analysis uses (1) the maximum sediment concentration from all reaches as the EPC despite the fact that many of the sediment samples were non-detect, (2) a very high exposure frequency of 68 days/year (as discussed in the preceding comments for the surface water pathways), (3) an inflated sediment ingestion rate that is not supported by the U.S. EPA guidance upon which it is purportedly based, and (4) an unreasonably high dermal adherence factor for youths, for whom one would not expect dermal adherence of sediment to be any greater than it would be for adults, given the same exposed body surface areas. However, the low risks that have been predicted in the HHRA for sediment contact pathways (cancer risks ranging from 3.9E-09 to 1.1E-07, and hazard indices ranging from 2.3E-04 to 6.7E-03),

despite the use of these very conservative assumptions, indicate that sediments at the Site do not pose a risk to the receptors evaluated. While any refinement of the exposure parameters to make them more site-specific and relevant will further reduce risks, it is not necessary or fruitful, from a risk point of view, to provide additional comments on these pathways.

Response 48: Sediment EPCs were calculated consistent with U.S. EPA guidance as discussed in Appendix B to the HHRA. Specifically, the frequency of censored (nondetect) results was appropriately considered in calculating the EPCs. Further, contrary to CBS's comment, the maximum concentration was not selected as the EPC in all cases; the sediment EPCs for Sections A and F are less than the maximum detected concentration. Therefore, the EPCs were calculated in an acceptable and correct manner, consistent with U.S. EPA guidance and will not be revised.

The exposure frequency for sediment will be revised to match the revised surface water and soil exposure frequencies as discussed above.

As discussed above for soil ingestion, the sediment ingestion rate for youths will be reduced from 200 to 100 mg/day.

Finally, U.S. EPA agrees that there is no reason to believe that the amount of sediment adhering to the skin of youths (7 to 18 years) and children (1 to 6 years) will be greater than the amount of sediment that will adhere to the skin of adults. Therefore, the risk assessment will be revised to use an adherence factor of 0.3 mg/cm^2 for adults, youths (7 to 18 years), and children (1 to 6 years).

Comment 49: CBS states that in addition to the pathway-specific risk estimates that are presented in the HHRA, U.S. EPA has gone on to calculate total risks by aggregating exposures and risks across multiple pathways. Tables 9 and 10 of the HHRA provide summaries of aggregated total risks and hazard indices, respectively. To calculate these, U.S. EPA has summed exposures due to fish consumption with exposures due to direct contact with surface water, sediment, bank soil and floodplain soil to derive total risk estimates for most of the reaches evaluated. There are a number of problems with this approach that result in unrepresentative risk estimates and provide inaccurate information that can be extremely misleading for decision-making by risk managers.

First, these aggregate risk estimates assume that all individuals who have some contact with water, soil, or sediment are also fish consumers. In all cases, the risks associated with the fish consumption pathways have been combined with the risks associated with other direct contact pathways. It is not unreasonable to assume that individuals who fish from Richland Creek may have some contact with surface water or with soil/sediment in the area at which they fish. However, it is likely that the vast majority of individuals who may have contact with sediment or soil do not also consume fish from the Creek.

Appendix A of the HHRA makes it clear that the fish ingestion rates derived for the 1-Mile Site are based on the assumption that a single individual is consuming all of the

available fish. Thus, the total risk estimates that are provided in Tables 9 and 10 may only be relevant for a single individual at each reach and are not likely to be representative of the recreational population as a whole. Risk managers may be misled by these aggregate risk estimates into assuming that these total risks to individuals who use the Creek for recreational activities apply to a substantially larger population than is actually the case.

In addition, U.S. EPA has combined fish ingestion with the other pathways evaluated at the North Spring, South Spring, and Conard's Branch, despite its own acknowledgement that they do not expect fish to be consumed from these sections of the Site. The inclusion of fish consumption risks in the total risk estimates for these areas is particularly misleading because it implies that risks to individuals who visit these areas are much greater than they actually are, since the vast majority of the estimated risks are based on the consumption of fish that are not even present or likely to be consumed from these areas. These total risk estimates could consequently lead risk managers to make remedial decisions for these upstream areas based on activities that do not occur there. If those risk estimates are used as the basis for remedial activities at Conard's Branch or the Springs, those activities will result in no change in residual risks because the risk estimates are driven by the fish consumption pathway, which is incomplete in these areas. Instead, any remedial decisions that are made for North and South Springs or Conard's Branch should be based only on activities that could potentially occur in those areas, which do not include the consumption of fish. Thus, the fish consumption pathway should be eliminated from the total risk and hazard estimates that are provided for Conard's Branch and the North and South Springs.

In addition, U.S. EPA presents total risks for pelagic fish and for benthic fish but does not provide risk estimates for combined fish. If, as U.S. EPA asserts, individuals may be opportunistic fish consumers, then it is likely that their total fish consumption rate will not increase but rather that the mix of fish will change depending upon availability and success. Thus, in order to provide a more realistic estimate of risks due to consumption of all types of fish, it is recommended that U.S. EPA present total risks that represent a mixture of those types of fish rather than a sum. It would be reasonable and conservative, if it is assumed that pelagic fish are more desirable but benthic fish are more available, to assume that 50 percent of the fish consumed are pelagic fish and 50 percent benthic fish when attempting to provide estimates of total risk across all available species. Such an assumption is plausible but conservative for the 3-Mile and 5.5-Mile Sites. However, as discussed previously, the productivity study conducted at the 1-Mile Site indicated that suckers represented less than 20 percent of the available biomass of consumable fish species there. Thus, at this reach, the EPC for combined fish should be weighted (e.g., 20 percent sucker, 80 percent pelagic fish) to reflect this reach-specific availability.

Finally, U.S. EPA's approach for aggregating total risks and hazards double-counts (for the 3-Mile Site) and triple-counts actual direct contact exposures for the other reaches that were evaluated (except the 5.5-Mile and 12.7-Mile Sites where only exposure to sediment was evaluated). In evaluating the potential risks associated with sediments, bank soils, and floodplain soils along different reaches of the Site, U.S. EPA has

considered each exposure pathway as a discrete exposure. Thus, for each evaluation, total daily soil ingestion rates and dermal contact rates have been combined with media-specific EPCs to estimate potential risks. While this is already a highly conservative approach when considering a single medium, it is completely inappropriate to sum the estimated risks and hazards associated with multiple media because to do so, yields risk results that are completely unrepresentative of potential exposures in those areas.

For example, the HHRA has used an upper bound soil ingestion rate for adults of 100 mg/day, which is assumed to be a total daily soil/sediment ingestion rate. However, for South Spring, North Spring, Section Pre-A, Section A, Section B and Section C, U.S. EPA has evaluated potential exposure due to the ingestion of sediment, bank soil, and floodplain soil separately, each using 100 mg/day as an ingestion rate, and then has summed these pathways to get an aggregate risk estimate. Thus, these aggregate risk estimates assume that individuals ingest 100 mg of sediment, 100 mg of bank soil, and 100 mg of floodplain soil on each day of exposure, for a total of 300 mg/day. This is not characteristic of recreational exposures and is not consistent with U.S. EPA's recommended soil ingestion rate. Instead, if individuals have contact with sediment, floodplain soil, and bank soil on a given day of recreational activity, then using U.S. EPA's conservative rate of soil ingestion, these individuals will still only ingest a total of 100 mg/day but that total will be comprised of a combination of sediment, floodplain soil, and bank soil. In order to aggregate exposures for these pathways combined, the HHRA should either apportion the total soil ingestion rate among the different exposure pathways or should conduct a separate calculation that uses an EPC that is based on a combination of sampling data for all three media, weighted as is deemed appropriate. The same is true for the dermal pathway.

The same approach was used for the 3-Mile Site although only two duplicative media were evaluated (sediment and bank soil). However, the same approach as was described above should have been used to aggregate risks so that the ingestion and dermal exposure risks are not double-counted, as they currently are.

The same problem is associated with the aggregation of the dermal pathways. For bank soil and floodplain soil, it is separately assumed that the head, hands, forearms and lower legs are in contact with these two media and the media are summed. However, during time spent engaged in recreational activities in these areas, the total surface area will be constant but the soil/sediment contacting it will either be floodplain soil, bank soil, sediment or some combination of the three media. Similarly, the adherence factors overestimate the loading of soil or sediment to the skin when it is assumed that an individual is in contact with more than one of these media on the same day and the risks due to both are summed. If U.S. EPA intends to continue to combine potential risks due to these pathways, then it is important that the EPCs be modified to reflect a combination of media or that the adherence factors be adjusted to reflect the relative contribution of each medium to total exposure.

Response 49: U.S. EPA acknowledges that the approach used in the HHRA to calculate total (or aggregate) risks and hazards included some double- and triple-counting of

potential soil and sediment exposures. Therefore, sediment and soil risks and hazards will be revised to eliminate double- and triple counting of sediment and soil exposures. Specifically, sediment and soil risks and hazards will be reduced to reflect the assumption of equal amounts of sediment and soil exposures at each location. Specifically, receptor-specific total exposures (for example, 100 mg/day exposure to soil and sediment) will be equally divided across the media to which each receptor is assumed to be exposed.

Also, because the available fish tissue biomass in Richland Creek may only support a small number (as low as one) of anglers, the majority of individuals that are exposed in and along the North and South Springs, Conard's Branch, and Richland Creek, are not likely to also ingest fish from Richland Creek at the assumed ingestion rates. Therefore, the revised HHRA calculations include two types of total risks and hazards: (1) totals for all relevant exposure pathways including sediment, soil, surface water, and fish tissue ingestion and (2) totals based only on all relevant sediment, soil, and surface water exposures.

The revised approach of presenting total risks and hazards including and not including fish ingestion will help risk managers differentiate medium-specific contributions to total risks and hazards. U.S. EPA continues to believe that it is reasonable to assume that receptors exposed to sediment and surface water at the North and South Springs and in Conard's Branch may also be exposed through ingestion of fish from nearby portions of Richland Creek. By presenting total risks and hazards with and without fish ingestion, risk managers will be able to clearly see the contributions from potential exposures to sediment and surface water at the North and South Springs and in Conard's Branch as compared to the contribution of fish ingestion from Richland Creek.

U.S. EPA acknowledges the fact that white suckers are "generally less desirable for consumption than sunfish and that white sucker are generally expected to make up a small portion of a typical angler's diet." Consistent with revisions made previously to the Lemon Lane Landfill HHRA, U.S. EPA will revise the benthic fish tissue ingestion rate to reflect the relative presence of benthic fish in the total biomass of Richland Creek. As noted in CBS's comments, white suckers make up "less than 20 percent" of the total biomass at the 1-Mile Site. Therefore, fish tissue ingestion rates at all reaches considered in the HHRA will be modified to reflect a relative presence of 80 and 20 percent pelagic and benthic fish in the total biomass. So, for example, at the 1-Mile Site a pelagic fish tissue ingestion rate of 6 g/day was calculated (see Table A-1 in Attachment 2). If 6 g/day represents 80 percent of the total ingestion rate, then a benthic fish tissue ingestion rate of 1.5 g/day represents the remaining 20 percent. This represents a reduction of more than 60 percent in the benthic fish tissue ingestion rate.

Comment 50: CBS states that in an effort to demonstrate the degree of overestimation of the risk estimates provided in the HHRA, CBS has recalculated potential risks to these receptors using the recommended assumptions outlined and discussed above. These revised risk estimates, and the basis for each, are provided in the following sections.

Response 50: Because U.S. EPA does not agree with some of CBS's proposed parameter value revisions, review and comment on CBS's revised risk estimates is not warranted. Note: responses to CBS's comments regarding exposure parameters used by Tetra Tech in the risk assessment are addressed individually above. However, U.S. EPA has recalculated potential risks to adult, youth, and child receptors using the revised assumptions and parameter values discussed above in U.S. EPA's responses.

Comment 51: CBS states that U.S. EPA's revised pathway-specific and total risk and hazard estimates are summarized in Tables 1 and 2, respectively, and are documented in Tables A1 through A5 in Attachment A. Specifically, Table A1 presents revised general and chemical-specific exposure parameter values, Table A2 presents medium-specific EPCs, Table A3 presents revised fish tissue risks and hazards, Table A4 presents revised surface water exposures, risks, and hazards, and Table A5 presents revised sediment and soil exposures, risks, and hazards.

Fish Consumption

To recalculate risks due to fish consumption, CBS has used fish consumption rates that are more reflective of the published literature on consumption of fish from rivers and streams. Thus, rates of 1 g/day, 4 g/day, 6.4 g/day and 12 g/day have been used to evaluate the 1-Mile, 3-Mile, 5.5-Mile and 12.7-Mile Sites.

These estimates are still very conservative, given the fact that a 30-year exposure duration has been used for all reaches. In fact, the limited number, sizes and types of fish present in these reaches is likely to severely limit their desirability as sport fisheries, making it unlikely that any long-term repeated fishing activity by the same individuals will occur. Instead, while it is conceivable that an angler might try to fish these reaches, the characteristics of the waterbodies and the lack of availability of large numbers of desirable species make it highly unlikely that an individual would return again and again over a period of 30 years when there are other, higher quality freshwater fisheries nearby. In addition, the fish trend analysis (QEA, 2006) indicates that fish tissue concentrations are decreasing at a rate of four percent per year. Thus the EPCs for fish tissue, which are based only on recent sampling results and do not reflect changes over time, and thus likely overestimate exposures over this duration. To show this impact of the downward trend on risk estimates, the risk and hazards were recalculated assuming the 4% downward trend continues for the 30 year exposure period.

The fish consumption pathway has not, however, been included in the aggregated total risk estimates for South Spring, North Spring or the remainder of Conard's Branch. In addition, a total risk estimate for combined fish has been included in the risk summary. For all the reaches, it is very conservatively assumed that half of the fish consumed are pelagic fish and half are benthic fish.

Surface Water Exposure

CBS has recalculated potential risks due to direct contact and ingestion of surface water, using long-term water concentrations based on average concentrations (when available) and maximum concentrations when not available. To do this, those samples that have non-detectable concentrations have been assumed to be present at ½ their detection limits, except for Sections F and G, where all analytical results were non-detect.

Since contact with surface water is only likely to occur during wading or swimming activities that take place during the summer months, the exposure frequencies have been adjusted. A frequency of 12 days/year has been used to evaluate North Spring, South Spring and Conard's Branch. A frequency of 24 days/year has been used to evaluate the 3-Mile, 5.5-Mile and 12.5-Mile sites.

Potential exposure through the ingestion of surface water has been eliminated as an exposure pathway from all reaches in which swimming does not occur and for which the average depth is too shallow to present a reasonable opportunity for accidental submersion and ingestion. In addition, the exposure frequency used for the ingestion of surface water in those areas where such exposure could occur has been modified to reflect the fact that exposure is only likely to occur as the result of accidental submersion.

For the wading scenario, exposed dermal surface areas have been modified to reflect the fact that individuals are not likely to wade into water past the depth to their knees, even if there is deeper water available. Thus, the surface areas used by U.S. EPA are the same for all areas, as presented in U.S. EPA Table 3, except that the maximum value for each receptor age group does not exceed the surface area for the feet and lower legs.

It has also been assumed that individuals will not spend more than 1 hour wading or swimming in surface water. Thus the exposure time has been reduced to 1 hour/event.

Floodplain and Bank Soil Exposures

The potential risks due to contact with floodplain and bank soil exposures have been recalculated to reflect the recommended changes in exposure frequencies. In addition, it should be noted that for Section A of Conard's Branch, Table 5 indicates that the EPC used for floodplain soil was 2.7 mg/kg. However, the detailed EPC derivation provided in Table B-12 of Appendix B indicates that the EPC should actually be 2.3 mg/kg. Thus this change has been made in the recalculation of potential risks associated with contact with floodplain soils in this area.

In addition, as discussed previously, U.S. EPA guidance recommends that an ingestion rate of 100 mg/day is a reasonable upper bound estimate for older children and adults. Thus, the revised risk estimates incorporate this ingestion rate for floodplain and bank soil exposures for youths.

Finally, CBS has added a factor for the fraction of soil contacted daily that is contaminated. That factor has been conservatively assumed to be 50 percent to reflect the fact that individuals will also spend at least half of their days in areas that are not contaminated.

Sediment Exposures

As discussed above, sediment exposures have not been recalculated due to the fact that the estimated exposures were already well below levels of concern. It should be noted, however, that if more reasonable parameters were used for the EPC, the exposure frequency, the sediment ingestion rate, and the dermal adherence factor, estimated risks for these pathways would be substantially lower.

Total Risks

Tables 9 and 10 of the HHRA present total risks and hazards for each of the areas of interest by combining risks associated with each of the exposure pathways evaluated. As discussed previously, in many areas, those risk estimates include potential exposure through the ingestion of fish, despite the acknowledgement from U.S. EPA that fish consumption will not occur in some of those areas. Thus, the recalculation of total risks eliminates the fish consumption pathway from all areas of the Site at which fish consumption is not expected to occur. For areas where fish consumption might occur, the recalculated total risks provide risk estimates for direct contact plus the ingestion of pelagic fish, direct contact plus the ingestion of benthic fish, and direct contact plus the ingestion of a combination of fish types.

In recognition of the fact that not all individuals who recreate along the site will also be fish consumers, a total risk for all of the relevant direct contact pathways in each reach of Conard's Branch or Richland Creek is provided. On days when exposure is expected to result from contact with more than one medium (floodplain soil, bank soil, and or sediment), the risks have been apportioned to reflect exposure to a combination of these media, not the summation of potential exposures to each. Thus, in areas where individuals are exposed to three soil/sediment media, it has been assumed that 1/3 of exposure is derived from each discrete medium. Similarly, in areas where individuals are exposed to two soil/sediment media on a given day, it has been assumed that ½ of exposure is derived from each discrete medium. Finally, in those areas where exposure only occurs due to one soil/sediment pathway, it is assumed that 100 percent of exposure is derived from that medium.

CBS has recalculated the potential risks and hazards for each of the reaches and presents the total risks for the combined pathways, using the recommended alternative EPCs and exposure assumptions discussed previously. Detailed calculations are provided in Attachment A to these comments. The resulting recalculated cancer risks and hazard indices are presented in Tables 1 and 2 using the same exposure point concentrations derived by Tetra Tech. Tables 3 and 4 present the risks and hazard indices assuming

exposure point concentrations averaged over a 30 year exposure period assuming a 4% decline in PCB levels in fish during the 30 year period.

Recalculated risks using the Tetra Tech exposure concentrations for the fish ingestion pathways are all either below or near the most conservative end of the U.S. EPA's acceptable risk range of 1E-04 to 1E-06, except for the ingestion of benthic fish in Section G, for which the estimate is slightly higher than the midpoint of that range. All hazard indices for fish consumption are below U.S. EPA's target hazard index of 1. When all of the relevant direct contact pathways are combined for each reach, excluding fish consumption, the estimated risks and hazards are all below or slightly exceed the 1E-06 risk benchmark and all hazard indices are below 1. When fish consumption is combined with direct contact exposures, the risks are dominated by the fish consumption pathways. As a result, the estimated total risks for each area are slightly higher but similar to the risks calculated for the fish consumption pathways. Using the average 30 year exposure point concentrations with a 4% decline, all risks/hazards decrease by about 45%.

These recalculated risk results indicate that risks in all reaches evaluated for the Site are well within U.S. EPA's acceptable risk range and only exceed the 1E-05 risk level when one assumes that an individual eats only benthic fish from Section G and that the exposure point concentrations do not change over the 30 year period. It is unlikely that fish consumption from this reach would be limited to benthic species or that the PCB levels in fish would be static for a 30 year period (existing data shows a downward trend). When it is instead conservatively assumed that an individual consumes a combination of benthic and pelagic species from this area, and that the concentrations of PCBs in fish continue to decline, the risk estimate for this pathway drops below the 1E-05 risk level.

Response 51: As described in the response to Comment 50, U.S. EPA does not agree with some of CBS's proposed parameter value revisions, review and comment on CBS's revised risk estimates is not warranted.

Comment 52: The risk assessment has only one line of evidence - the calculation of theoretical hazard quotients for mink and kingfisher. This line of evidence is biased, as dictated by Superfund guidance, to be very conservative and is not a direct measure of any real effect on wildlife at the site. Other lines of evidence could be evaluated to reduce uncertainty and to determine if in fact there is any real impact in the field. Specifically, a survey of which receptors are actually present at the site and their reproductive status might be warranted before extensive remedial activities are deemed necessary. However, U.S. EPA did not consider other lines of evidence. U.S. EPA guidance for ecological risk assessment (U.S. EPA, 1997, 1998) lists other lines of evidence that can be considered, including:

- Measurements of the abundance, diversity and other characteristics of exposed invertebrate, fish and wildlife communities

- Measurements of reproductive success in fish, birds and mammals

- In-situ, whole-media, and dietary toxicity tests using selected receptors or appropriate surrogate species

These lines of evidence incorporate more site-specific information, based on actual site biological measurements, to reduce uncertainty and to see if effects are evident. As such, these lines of evidence can act as a reality check on theoretical projections of risk that are derived from hazard quotients. The approach taken by U.S. EPA is only the first step in the risk assessment process and the conservative nature of the assumptions and parameters used in the assessment make it useful only to rebut the presumption of risk. It is not appropriate to use such an assessment to conclude that there is risk to any ecological receptors (Fairbrother, 2003).

U.S. EPA has responded to this issue by noting (U.S. EPA 2005):

> "There are several problems associated with the proposal to measure adverse effects in field studies that are related to the nature of releases at this site. Neal's Landfill is a continuing source of PCBs to Richland Creek via Conard's Branch. To have value for establishing site-specific water quality goals for these releases in place of ambient water quality standards, the field studies have to be appropriately scaled to target the risks associated with these releases over the most contaminated portions of the receiving water body, in this case, the first few miles downstream of the point of release. A major limitation is that replication will not be feasible in the study design. A second limitation is that suitable receptors may not be available for study in the appropriate location in a particular field season. A third limitation is uncertainty over whether and to what extent the monitored species are actually exposed to site contaminants, and through which pathways. If the receptors included in the field study feed predominantly off-site or feed predominantly on non-aquatic prey, the study results will have little relevance for decisions concerning source control of surface water releases. A fourth limitation is that the study will likely require several years to gather sufficient data (assuming the previous limitations can be adequately addressed), further delaying remedial actions at the site".

In essence, U.S. EPA is saying that field studies are problematic for a number of reasons which are associated with the "nature of the releases" and scale of the site. U.S. EPA is not very explicit in how the "nature of the releases" will prevent "replication" in study design. However, U.S. EPA does perform field studies at many other superfund sites as part of the risk assessment process. Of particular note is the U.S. EPA comment that "uncertainty over whether and to what extent the monitored species are actually exposed to site contaminants and through which pathways". With this statement U.S. EPA is showing concern that the conservative assumptions they have made in the risk assessment may not be borne out by actual field studies. U.S. EPA also lists timing as a reason not to do field studies. However, CBS originally made the comment about the lack of field studies to ground truth the U.S. EPA risk estimates over 3 years ago. Had the U.S. EPA seriously considered the usefulness of field studies at that time, field studies would certainly have been timely with regard to risk assessment conclusions.

So the remedy for U.S. EPA possibly discovering that their assumptions are overly conservative is to avoid performing any field study that might show this. Surely there are some field studies that could be performed that would be appropriate to the scale of this site and place in perspective the theoretical risk calculated by U.S. EPA using their conservative assumptions.

For example, U.S. EPA recently added risk to fish in their latest version of the risk assessment. In estimating a theoretical risk to fish, U.S. EPA has used very conservative assumptions including TRVs for salmonids which are one of the most sensitive species with respect to dioxin like contaminants (U.S. EPA has done this knowing full well that salmonids are not a potential receptor in these water bodies). Performing population studies of resident fish to evaluate the existence of any significant population level effects by comparing to reference sites is a standard practice and could have been readily performed. In fact, CBS has performed some population studies on fish in Richland Creek both upstream and downstream of the Neal's Landfill drainage (CBS 2006, Tetra Tech 2003). U.S. EPA has reviewed these studies and could have used or supplemented this data to evaluate the existence of any substantial population impacts on fish communities and/or populations.

Response 52: The ERA considered three lines of evidence: potential risks to mink, kingfisher, and fish, which showed similar levels and spatial patterns of risk. A supplemental line of evidence considered in the ERA is that the PCB concentration in the liver of a road-killed mink is consistent with the mink exposure model and the risk estimates in the ERA for that location.

The ERA is consistent with Superfund guidance and practice at other sites.

Neal's Landfill is an ongoing continuous source of PCBs to Conard's Branch and Richland Creek. The initial approach taken in the ERA was to use site-specific measurements of PCB accumulation in fish to assess potential risk to animals (mink and kingfisher) feeding predominantly on fish, because remedial actions based on protectiveness for fish-eating animals is expected to be protective for the myriad aquatic organisms included in freshwater communities. However, this assumption of umbrella protection of aquatic organisms through assessment of fish-eating animals is only applicable when the fish-eating animals are assessed for full utilization of the contaminated body of water. The assumption of protection of aquatic species is invalid when risk to fish-eating animals is assessed for partial utilization of the receiving body of water, whether calculated as potential risk from fish tissue data, or assessed in a field study of fish-eating animals that only feed part of the time in the area of concern. This is the scaling issue for field studies of mink or kingfisher for assessing the risks of PCB releases from Neal's Landfill. PCB accumulation in fish is very high near Neal's Landfill, the source of PCBs, and decreases downstream. Correspondingly, the potential risk to fish-eating animals is elevated through at least 2 miles downstream, is possible but sparsely documented 3 and 6 miles downstream, and is below levels of concern beyond 13 miles downstream. In order to modify the risk conclusions in the ERA based on

dietary exposure to measured PCB concentrations in fish, a field study of mink or kingfisher would need to measure the impacts on animals utilizing the first few miles of Conard's Branch and Richland Creek downstream of Neal's Landfill. Animals feeding further downstream would not provide useful information for assessing risks in the upper portion near Neal's Landfill. In any given field season, the number of usefully positioned territories would be small.

Field studies of fish are not spatially limited to the same degree because fish have much small home ranges compared to mink or kingfisher. Since completion of the ERA in 2005, a field study of the age structure and growth of creek chub populations in Conard's Branch and the upper portion of Richland Creek has been published (Henshel, et al. 2006, see Attachment 3). Adverse effects were reported for both growth and survival in comparison with a reference location. The observed decrease in long-term survivorship in female creek chub is consistent with assessment of risk to fish in the ERA, which concluded that creek chub would need to be more than an order-of-magnitude less sensitive than adult rainbow trout (the source of the toxicity information) to not be at risk of decreased survival in the upper portion of Richland Creek, and more than 2 orders-of-magnitude less sensitive to not be at risk in Conard's Branch. The field study was replicated at in a second PCB-contaminated stream with similar results.

The study on the toxicity of dioxin to rainbow trout (a salmonid) was used in the ERA because it is the only available controlled study on the effects of long-term exposure to adult fish. As discussed in the ERA, salmonids are among the most sensitive species to dioxin-like effects in eggs, but rainbow trout are *less* sensitive than several other species at the juvenile stage. The ERA explicitly recognizes that the species present in Conard's Branch and Richland Creek are unlikely to have the same sensitivity to dioxin-like chemicals as rainbow trout, and utilized the available information on species sensitivity differences (based on toxicity studies with juvenile fish and fish eggs) to adjust risk estimates. The risk characterizations for fish in the ERA are based on the adjusted risk estimates (sunfish and sucker), and, where adjustment for inter-specific difference in sensitivity was not possible (creek chub), on the magnitude of the sensitivity difference necessary to conclude that risk is unlikely. Since creek chub would have to be 1 to 2 orders of magnitude less sensitive than rainbow trout to not be at risk, it appears likely that creek chub may be adversely impacted. The field study of creek chub populations by Henshel, et al. (2006) provides supporting evidence that creek chub survival is reduced in Conard's Branch and the upper portion of Richland Creek.

Comment 53: Since the assessment uses the same TRVs that U.S. EPA has used in the other Bloomington area ERAs, CBS has the same comments made previously with respect to those TRVs. Specifically:

- The methods used to derive some of the TRVs for both mink and birds are novel and their utility and accuracy have not been established. In particular, CBS has a number of concerns about the TRVs and the methods that were applied in deriving them that were presented in the document entitled "Toxicity Reference Values (TRVs) for Mammals and Birds Based on Selected Aroclors", from U.S. EPA Region V, dated

March 6, 2003 (which is included as a part of U.S. EPA 2006, Focused Ecological Risk Assessment, PCBs and Mammalian and Avian Piscivores in Conard's Branch and Richland Creek, August 10). For example, the combination of data from various studies and then the extrapolation of NOAELs and LOAELs from the combined data sets have several obvious limitations, including the comparability of methods between studies. While U.S. EPA avoids the use of term "extrapolation" in favor of the term "interpolation" when using this technique, in fact the U.S. EPA is extrapolating in some cases beyond the tested dosage in one study to dosage levels tested in different studies under different conditions. To our knowledge, these approaches have not been externally peer reviewed and are in contrast to the typical U.S. EPA method of deriving TRVs from relevant single high value studies.

- The TRVs for mink have been adjusted to account for two breeding seasons. It is not clear that this is a generally accepted or scientifically valid procedure. In their TRV memo, U.S. EPA evaluated the Brunström *et al.*, (2001) study and concluded that "the low effect TRV for exposure over 2 breeding seasons (1.3 ppm PCB) is 42% of the corresponding TRV for 1 season exposure (3.1 ppm), and the 2-season no effect TRV (1.1 ppm) is 47% of the 1-season value (2.4 ppm)." These TRVs are clearly artifacts of the interpolation method used by U.S. EPA since only two doses were evaluated by Brunström *et al.*, (2001) and yet U.S. EPA derived four different TRVs from this study. Furthermore, U.S. EPA's TRVs are based on a narrow definition that considers only a single endpoint rather than deriving a TRV based on the most sensitive, ecologically relevant endpoint(s), as is commonly done with setting a TRV. Clearly, the results of Brunström *et al.*, (2001) demonstrate the toxicity of the European Clophen technical mixture. If one focuses on reduced birth weight of kits as an endpoint, then it is clear from this study that the LOAEL TRV (0.3 mg Clophen A50/mink/d or 2 mg/kg in diet) is the same for both the 6-month and 18-month exposures (compare Tables 3 and 5 in Brunström *et al.*, 2001). However, the more sensitive endpoints from this study were the numbers of 2-week old kits per mated female and weights of kits at 2 and 5 weeks of age. Using these more sensitive endpoints, the LOAEL is 0.1 mg Clophen A50/mink/d (or 0.67 mg/kg in feed) at the 18-month exposure. However, since the authors did not present data on these endpoints for the 6-month exposure, there is no way to directly compare TRVs for 6 and 18-month exposures for these endpoints. Thus, this study does not support the derivation of a 1-season to 2-season uncertainty factor. Similarly, U.S. EPA's analysis of the Restum *et al.*, (1998) study does not support a 1-season to 2-season uncertainty factor. Again, the TRVs derived from this study by U.S. EPA are artifacts of the interpolation method used by U.S. EPA and the narrow definition of a TRV that utilized a single endpoint rather than deriving a TRV based on the most sensitive, ecologically relevant endpoints. As before, the lowest dose tested for both seasons determined a LOAEL and therefore, the uncertainty associated with estimating a NOAEL from this study would be relative great. For example, based on the most sensitive, ecologically relevant endpoint from this study, reduced body weight of 6-week old male kits, it is clear that the LOAEL TRV (0.25 mg PCBs/kg in diet) is the same for both the 6-month and 18-month exposures (compare Tables 8 and 9 of Restum *et al.*, 1998). Thus, this study and the other study cited by U.S. EPA

(Brunström *et al.*, 2001) do not support the derivation of a 1-season to 2-season uncertainty factor. The most recent high quality studies (for example the Housatonic River fish feeding studies detailed in Bursian et al 2003) have not involved multiple breeding seasons. Similarly the USFWS is planning a similar mink feeding study with Hudson River Fish and this is also proposed as a single season study (Hudson River Natural Resource Trustees 2006). This is an indication that multiple breeding seasons are not judged to be a significant factor in TRV development for mink by much of the scientific community including U.S. EPA or FWS at other high profile PCB sites. If this factor was omitted, the resulting Hazard Quotients would drop by about a factor of 2.

- Relative to assessment of potential effects thresholds in mink, the study conducted by Michigan State University under contract with the U.S. EPA (Bursian *et al.*, 2003) where fish from the Housatonic River were fed to mink is the highest quality, most relevant study from which TRVs can be determined. U.S. EPA disregards this study because the original technical grade of PCBs released at the Housatonic River was Aroclor 1260. While the original PCB technical mixture released to the Housatonic River may have been different from those released at this site, it has been established that TEQs are the most accurate predictor of toxicity to mink. A variety of weathering and bioaccumulation processes have altered both the PCBs released in Bloomington streams and those released to the Housatonic. Upon review of the residue data from both the Housatonic mink feeding study and Neal's Landfill fish, the relative potency of the dioxin-like activity, in the units of mg TEQs/kg PCBs, were found to be lower for the Neal's Landfill fish than for the Bursian study fish (Table 1). Additionally, for both sites PCB congener 126 (not dibenzofurans which can be the main contributor to TEQs for a neat Aroclor 1260) was found to be the main contributor of TEQs. Thus, selection of this study as the basis for TRVs is relevant and likely conservative for this site. U.S. EPA has used Aroclor 1260 field derived TRVs at sites contaminated with Aroclor 1242 in other high profile risk assessments. For example, in the Hudson River ERA (U.S. EPA 2000), U.S. EPA used a NOAEL TRV for great blue heron that was based on a Halbrook (Halbrook *et al.* 1999) field study where Aroclor 1260 was the contaminant. The main contaminant released at the Hudson River site is also Aroclor 1242, the same as at Neal's Landfill. While most recently, U.S. EPA has chosen to compare the LC20 and LC10 reported in the Bursian study (Bursian 2006) to their TRVs derived for this site, the probit analysis used to derive the EC20/10 results reported in the Bursian 2006 study is incomplete. For example, there is no detailed analysis of the goodness of fit for the fitted curve and the results of the probit analysis, presented in figure 2 of the Bursian 2006 paper, are less than convincing that a reasonable fit of the selected model exist to the actual data. It should also be noted that figure 2 in Bursian 2006 only presents summary data for the mortality at 6 weeks which prevents any real assessment of the goodness of fit. While a properly conducted probit analysis can derive valuable information concerning non-tested dosages, relying on the results of a probit analysis without an analysis of the model to the fit to the observed data can be misleading. CBS has recalculated an estimated risk to mink using the TRVs